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THE JOHNS HOPKINS UNIVERSITY

Editor—HENRY E. SIGERIST

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THE HISTORY OF THE DEVELOPMENT OF THE STOMACH TUBE WITH SOME NOTES ON THE DUODENAL TUBE

JULIUS FRIEDENWALD, M. D.

AND

SAMUEL MORRISON, M. D.

The introduction of instruments of precision with their constantly changing additions and improvements frequently represent important stages in the development of a specialty in medicine. One need only refer to such instruments as the ophthalmoscope, laryngoscope, stethoscope, proctoscope, cystoscope and others as proof of this fact. Thus the stomach tube from the earliest times in its primitive form, to the present day with its many modifications and increasing possibilities has continuously played a peculiarly important role in the advancement of gastro-enterology.

Even previous to the discovery of the primitive tube, various practices were indulged in by the Romans to induce vomiting at the completion of a banquet in order to prevent the after effects of an overloaded stomach as well as to give place again for another meal. At times emetics were employed but these seemed too uncertain in their results, and unpleasant as well. Often the doses were too small and produced an annoying nausea without emesis; in other instances, the quantity was too great and produced vomiting to such a degree that it did not cease although the stomach was completely emptied.[1] However, it was soon realized, that it was only

necessary to apply the finger to the throat to accomplish the same result. To escape the ill effects of these procedures Emperor Claudius and his guests were accustomed to allow the throat to be irritated with the "pinna" or vomiting feather at the completion of a banquet. It was as the result of the application by his physician of such a feather to which poison had been applied that Claudius succumbed at the instigation of Agrippina.

Acording to Aristophanes and Nicander,[1] the renowned Alexandrian physician, a similar method of producing emesis was practiced in ancient Greece.

The celebrated medical historian Oribasius of the fourth century, A. D.[2] fully described the methods employed in producing emesis at that time. Swinging the individual in a suspended bed was practiced until an artificial sea-sickness was produced. He likewise recommended as a substitute for the use of the finger, eight to ten goose feathers dipped in iris oil or cypress oil applied to the throat to induce vomiting. He also described an instrument consisting of a long feather glove-finger, ten to twelve inches in length, of which the lower two-thirds are to be filled with wood fibre while the upper third is to remain empty to receive the directing finger of the physician. The digital vomitorium was to be lubricated with the oils already referred to and introduced into the esophagus. This instrument was considered by Leube[3] as the most primitive type of stomach sound.

After the fall of the Roman Empire and with it its pomp and sumptuous feasts, the need of instruments to produce emesis was materially lessened and thus this method was finally found to have but slight practical value except in those instances in which patients required the treatment as in certain diseases and for removing poisons.

Avicenna[4] in his writings in the 11th Century had also advised the use of a similar apparatus for the evacuation of the stomach. In his work on poisonings, Hieronymus Mercurialis (16th Cen-

[1] Hemmeter: New York Medical Jour., 62: 819, 1895.
[2] Oribasius: Collection médicale (ed. Daremberg), Book 8, ch. 6.
[3] Leube: Die Magensonde, Erlangen, 1879, p. 5.
[4] Avicenna: Liber canonis, Venice, 1544, Lib. 1, Fen IV, Ch. 20, S, 83.

tury) recommended the application of the lorum vomitorium to produce emesis. This instrument had especially been lauded by Scribonius Largus [5] in conditions of opium poisonings. It dates as far back as the first Century. The lorum vomitorium, a poorly described instrument, consisted, according to Leube, of a leather strap treated with some nauseating tannic acid-containing substance which produced emesis when introduced into the esophagus due to its obnoxious taste.

The three methods described, namely, the pinna, digital vomitorium, and lorum vomitorium, had as a common purpose the evacuation of the contents of the stomach.

A further step toward the development of the more modern tube was made possible as the result of the introduction of apparatus intended not only for emptying the stomach of its contents but also for removal of foreign bodies from the esophagus or forcing them into the stomach. The oldest instruments utilized for this purpose were short perforated metallic tubes so constructed as to clasp foreign bodies such as fish bones and thus to extract them. As an example may be cited the lead tube of Johannes Arculanus [6] which is described in his work on surgery (1493) and the more perfected ones of silver of Ryff,[7] Scultetus [8] and others. Leube [8] cites Guilielmus Fabricius Hildanus [9] whose great skill was recognized in removing foreign bodies from the esophagus with a perforated tube to which a small sponge was attached at its lower end. Hildanus remarks "It consists of a hollow silver bent tube the size of a swan's feather about a foot and a half in length. This tube which is perforated throughout its length and has a sponge, the size of a hazel nut, securely attached at its end is introduced into the esophagus and is utilized with much success in extracting fish bones, small bones and other foreign objects." An advance was made by

[5] Scribonius Largus: Scribonii Largi Compositiones medicinales rec. Joan. Rhodinus, Patav. 1530, Composition 180, Cap 48.

[6] Johannes Arculanus: Johannis Arculani Veronensis Practica partic. morb. omn., Venice, 1557, p. 82.

[7] Ryff, W. H.: Gross Chirurgie, etc. Frankfort A. M., 1559, Part 1, p. 37.

[8] Joannes Scultetus: Wundartzneyisches Zeughaus, Frankfort Ulm, 1679, p. 108.

[9] Guilielmus Fabricius Hildanus: Observation. et curat. Chirurg. centuriae 1641, Cent. 1; Observ. 36, Sect. S 48.

Hieronymus Fabricius ab Aquapendente [10] in advocating the propulsion of foreign bodies into the stomach when there was no possibility of their extraction by mouth. He also devised an instrument for artificial feeding. This was accomplished through a silver tube covered with sheep's intestine to be utilized for patients affected with difficulties in deglutition. Thus as early as the 16th and 17th Centuries a new method of artificial alimentation was devised and a new principle established which has gradually led to the further development of the stomach tube and to its present day modifications.

Toward the middle of the 17th Century a new application of the tube made its appearance in Europe and was heralded as a marvelous therapeutic measure. It was variously termed stomach cleanser or brush or " magenkratzer or magenraumer." This instrument was devised so as to apply treatment directly to the interior of the stomach. The stomach brush consisted of a long smooth flexible arched whalebone two to three feet in length tipped with an ivory button to which a tuft of silk cord, horse hair or linen was firmly attached. The instrument was passed down the esophagus into the stomach and applied as a cleansing apparatus. The remarkable success attained by means of this instrument spread rapidly through Europe and many reports concerning its use were published in England, France, Norway and Germany.

Rumsey,[11] an English physician likewise earnestly recommended its use. According to Sobierus,[12] a similar brush was utilized in France in 1694 and Pecklin [13] describes its employment by two Norwegian peasants in the presence of the King of Denmark.

This method of treatment finally developed into an actual form of so-called " Cure "; the instrument being kept in a church or convent and treatment practiced there under great secrecy.

Leube narrates the following interesting account of a Russian statesman upon whom the stomach brush was used: A statesman who had returned from Russia and who had been in bad health due

[10] Hieronymus Fabricius ab Aquapendente: Chirurgische Schriften ed. Joh Scultetus, Nurnberg, 1716, ii Part, Chap. 39, p. 92.

[11] Rumsaeus: Organum Salutis, or an Instrument to Cleanse the Stomach, 1649.

[12] Sobierus in Soberiana, Paris, 1694.

[13] Pecklin, J. N.: Observat. physico-medicarum, Lib. 1, Obs. 50, p. 116, Hamb., 1691.

Gründliche und Vollständige

Beschreibung

Des

Peniculi Ventriculi singularis, quo nempe Ventriculus detergitur & expurgatur, sive Novi Instrumenti Repurgatorii Ventriculi.

D. i.

Der sonderbaren und Curieusen

Magen-Bürste/

Magen-Krätzers/ oder Magen-Räumers/

Wie solches Mechanische Instrument in vielen Incurablen und Desperaten Kranckheiten vortrefflichen Effect gethan, und solche feliciter geheilet / auch wie man so wohl Præservative, als Curative seine Gesundheit lange Jahre erhalten könne;

Aus unterschiedlichen gelehrten Observationibus denen nachstehenden Patienten / so solche höchstnöthig brauchen zum Trost und grossen Nutzen/dem Curiosen Leser aber zum Divertissement mit Fleiß in Druck gegeben

Durch

J. C. Socratem, M. P.

Leipzig zu finden bey JOH. THEODOR BOETIO. 1712.

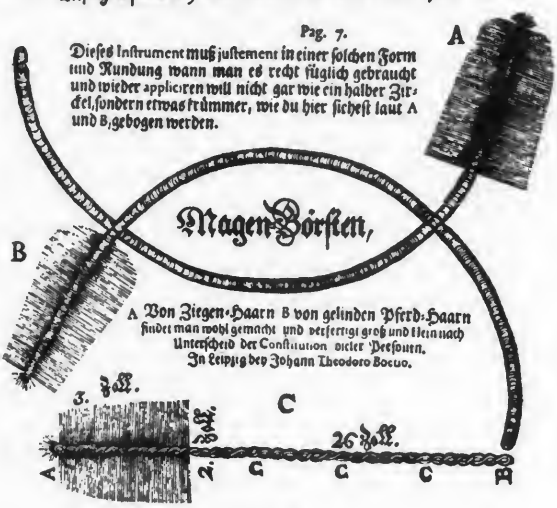
Pag. 7.
Dieses Instrument muß justement in einer solchen Form und Rundung wann man es recht füglich gebraucht und wieder appliciren will nicht gar wie ein halber Zirckel, sondern etwas krümmer, wie du hier siehest laut A und B, gebogen werden.
A
B
Magen-Borsten,
A Von Ziegen-Haarn B von gelinden Pferd-Haarn findet man wohl gemacht und verfertigt groß und klein nach Unterscheid der Constitution vieler Personen.
In Leipzig bey Johann Theodoro Boetio.
3. Zoll.
C
26 Zoll.

FIG. 1.

Taken from Münchener Medizinische Worchenschrift, 72: 863 (May 22) 1925. "Geschichte der Medizin: Zur klinischen Geschichte der instrumentellen Entleerung, Untersuchung und Behandlung des Magen." Von Erich Ebstein in Leipzig.

to the abuse of alcohol as well as from over-fatigue was advised by the King to enter a convent for treatment. The inmates of the convent were in remarkably good health, notwithstanding their ages; among them a priest of 115 years who was still able to read and write without the use of glasses. The statesman seemed greatly impressed by the sight of such healthy individuals and was encouraged to undertake treatment. After four weeks of treatment under the usual medication no relief was obtained. The monks then decided to undertake the " secret cure " which they had been accustomed to practice upon themselves. However, after arranging for the fee, the patient was required under oath to swear never to reveal the "Arcanum", the method which was to be undertaken to restore him to health. The "Arcanum " was none other than the stomach brush and treatment was instituted following certain preparations. At first he was required to imbibe a dose of brandy and water and then recline on his back for a quarter of an hour in order to stir up the putrid mucus. As soon as the bile and slimy secretion began to be vomited he was required to again recline in the recumbent posture and then two brothers began the introduction of the stomach brush into his mouth and then into the stomach. Although the patient seemed extremely distressed by the treatment and squirmed, spat out and vomited and begged to have the treatment discontinued he was nevertheless forced to drink more water and the brush was again applied until the stomach was entirely cleansed of mucus and until a thick putrid mucus, bile, clotted and foul smelling yellow purulent material had been discharged by mouth. The patient was then allowed to take chicken broth and an elixir and fell into a sound slumber from which he awakened in a very refreshed state. Twelve hours following the first operation a second was undertaken and a third the following morning.

The patient then slept for ten hours and awakened with an increased appetite and was able again to consume an egg, soup and nearly an entire capon. The observation was made during the treatment on the following day that the soup and eggs had been entirely digested and had passed on as well as most of the chicken although some remnants of the chicken breast were still present and vomited with the remaining putrid matter. On this account the conclusion

was reached, that it was absolutely necessary to have the process repeated. This was undertaken in the morning and was continued at 24 hour periods for eight days. At the end of this time, the patient was quite able to continue on his journey in good health and in good spirits. For a full 14 years he continued with the treatment himself and only betrayed his promise because of his compassion for sick, weak and tuberculous patients for whom there was no longer hope of recovery. Finally the secrecy with which this method of treatment was surrounded disappeared and its use was generally advised by Socrates [14] even for healthy individuals as a prophylactic measure with the object of attaining a long life and as a curative measure for all stomach troubles. He remarks that cleansing the stomach by means of this procedure and following it by the administration of aloes, saffron and myrrh will protect the body from poison and pests for 24 hours. A large variety of conditions were likewise considered to be favorably influenced by this form of treatment, namely fever, asthma, consumption, headaches, apoplexy, toothache, etc., and the statement was made by him that "it appears as if death had laid aside its scythe and instead has had the stomach cleanser placed in his hands."

The stomach brush was now manufactured in various places and was very commonly used by patients; some physicians even advocated its use for all forms of stomach affections. The instrument recommended by Socrates and pictured by Socrates [14] and Heister [15] was constructed of strong carefully bound and padded steel wires which were encircled with silk thread. It was 26 inches in length and was tipped with a brush three inches in length and two in breadth which was held firm by means of goat or horse hair. Before applying the instrument it was to be somewhat bent and also to be thoroughly saturated with water. Diluted brandy was to be taken in advance of the treatment.

The poor results attained from this form of treatment in some instances and the fatalities that occurred especially in certain cases of carcinoma of the stomach gradually led to its disuse, and the instrument in the form of whale bone sound tipped with a sponge

[14] Socrates, J. C.: Lips. & Frankfort, 1713, and Breslauer Sammlung von Natur und Medicin etc.—Geschichten, 1719, Febr., Classe V, Art III.

[15] Heister, L.: Institutiones Chirurgicae, 1739, pt. II, Sect. IV, Cap. 106.

was, however, only continued to be utilized for the treatment of esophageal diseases and especially in obstructive affections. The famous case of Thomas Willis [16] is interesting. His patient had difficulty in swallowing which gradually increased to such a degree that he was no longer able to swallow food. Death seemed imminent. Willis prepared an esophageal sound and the patient was given food and this was thrust down the esophagus by means of this instrument. He received treatment in this manner for 16 years. Instead of the sponge tip-ivory olive bougies were introduced by Geuns [17] for the treatment of stenosis of the esophagus. Abercrombie [18] employed a silver esophageal sound with an oval knob at its tip for this purpose with great success.

It is of especial interest to note that Dapper [19] had described as early as 1673 a method of direct treatment of the interior of the stomach by means of an improvised sound utilized by the Indians in South America. He remarks "The Tapagus, a Brazilian Tribe have a remarkable method of cleansing the stomach. They pass a rope made of padded sharp leaves down the throat and into the stomach and then turn and twist it until vomiting and a bloody discharge occurs. The rope is then withdrawn and the stomach is cleansed."

The problem which had not been satisfactorily solved up to this time and still confronted the physicians of this period was that of artificial feeding as well as the possibility of introducing remedies into the stomach when deglutition was impeded and likewise when the contents of the stomach required complete and prompt removal than was possible with emetics. This could only be accomplished with a sound of tubular form and of sufficient length as to extend into the stomach.

Hieronymus Capivacceus [20] and Fabricius ab Aquapendente [21]

[16] Willis, Thomas: Pharmaceutice rationalis Tour 1, Sec. ii, Chap. 1; XV, 1, 1673.

[17] Geuns, M. van: Harlemer Abh. XI, 123 Sammlung auserl. Abh IV, S. 387, 1784.

[18] Abercrombie: Die Krankheiten des Magens, übers. von G. V. D. Busche, 1830, s. 128.

[19] Dapper: Die Unbekannte neue Welt. etc., Amsterdam, 1673, p. 566.

[20] Hieronymus Capivacceus: Medic. practic., Lib. 1, Cap. 53, Venice, 1598.

[21] Fabricius ab Aquapendente: Chirurg. Schrift Nürnberg, 1716, Theil ii, Cap 33.

(with illustration of his apparatus) were among the first to attempt to apply this form of treatment. Capivacceus employed a tube with an animal bladder attached at its upper end containing a nutritive fluid which was expressed into the stomach. Fabricius ab Aquapendente introduced a small silver tube covered with lamb's intestine through the nose into the esophagus for purposes of artificial feeding.

A further development of significance was achieved when Van Helmont [22] in 1646 discovered a method of manufacturing flexible catheters of leather which naturally could be made of considerably greater length and by Boerhaave [23] (1668 to 1738) who suggested the use of a flexible stomach tube in cases of poisoning in individuals unable to swallow antidotes.

On March 21, 1776, John Hunter [24] read a paper on " Proposals for the Recovery of Persons Apparently Drowned " in which he advised the use of " a syringe with a hollow bougie or flexible catheter of sufficient length to go into the stomach and convey stimulating matter into it without affecting the lungs."

Again 17 years later (1793)[25] he published a paper read September 21st, 1790 on "A Case of Paralysis of the Muscles of Deglutition, Cured by an Artificial Mode of Conveying Food and Medicines into the Stomach " in which he reported the case of John S., a patient of 50 years of age who had become hypochondriacal, depressed, extremely nervous and suffered many nervous attacks and sensations. One morning he awakened " with a sense of choking and felt soon after a numbness in the whole of his right side together with a paralysis of the muscles of deglutition which deprived him of the power of swallowing." Many forms of treatment were given without success and the administration of food and medication was

[22] Van Helmont: Doctrina inaudita de causa etc., lithiasis, 1646, Cap. vii, 34, p. 140.

[23] Boerhaave: Praelectiones Academicae in Proprias Institutiones rei Medicae 6, 388 para, 138, Amsterdam, 1744.

[24] Hunter, John: Proposals for the recovery of persons apparently drowned. The complete works of John Hunter, edited by Palmer, Haswell, Barrington and Haswell, 1841, IV, Phila., p. 185.

[25] Hunter, John: Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, St. Paul's Churchyard, London, 1793, Vol. 1, p. 182 and the Complete works of John Hunter, edited by Palmer, Haswell, Barrington and Haswell, 1841, 3, 580, Phila.

advised by Hunter through a hollow flexible tube passed into his stomach. This was undertaken by him and given twice daily. The paralysis gradually disappeared under the influence of flour of mustard and tincture of valerian and the power of swallowing gradually returned. "The instrument made use of was a fresh eel skin of rather a small size, drawn over a probang, and tied up at the end, where it covered the sponge, and tied again close to the sponge, where it fastened to the whale bone, and a small longitudinal slit was made into it just above this upper ligature. To the other end of the eel skin was fixed a bladder and wooden pipe, similar to what is used in giving a clyster, only the pipe was large enough to let the end of the probang pass into the bladder without filling up the passage. The probang thus covered was introduced into the stomach, and the food and medicines were put into the bladder and squeezed down through the eel skin."

In his Inaugural Thesis, Alexander Monro, Jr.[26] in 1797 suggested the use of the tube and syringe in cases of poisoning for the extraction of the poison from the stomach and for the introduction of food into the stomach in cases of dysphagia in human beings. He likewise pointed out that his father as early as 1767 had employed a flexible tube to remove fermenting fluids and gases from the stomach of cattle affected with oesophageal spasm causing great distention and in whom vomiting was impossible.

In France both Renault[27] and Dupuytren[28] followed in 1803 with the suggestion for the employment of a flexible tube of sufficient length to reach the stomach connected with a syringe to aspirate the stomach in case of poisoning.

The treatment recommended by Renault and Dupuytren was highly lauded by Orfila[29] in his treatise on poison. Larrey[30] who

[26] Monro, Alexander, Jr.: Disputatio Medica Inauguralis de Dysphagia, pp. 78, 80, 1797.

[27] Renault, C.: Nouvelles Expériences sur le contra-poisons de l'arsenic 93, Paris, 1803.

[28] Dupuytren: Cadet, F. Fils. Secours à administrer dans les empoisonnemens, d'après la méthode de M. Dupuytren—Bull. de Pharm 2, p. 62 (Feb.), 1810.

[29] Orfila, M. P.: Directions for the Treatment of Persons who have taken Poison, First American Edition, Baltimore, 1819, p. 41 and Orfila, M. P.: General System of Toxicology, Phila., 1817, p. 40.

[30] Larrey, D. J.: Relation historique et Chirurgicale de l'expédition de l'armée d'orient en Egypte et en Syrie, Paris, 1803, p. 286.

was Napoleon Bonaparte's Surgeon General narrates interestingly how, after a soldier had been shot in the throat at the Battle of Aboukir in 1801 and was no longer able to swallow any liquids, he passed a flexible tube into the esophagus and was thus enabled to feed the patient. This treatment was continued over a long period and the life of the patient was thus saved.

The credit for the introduction of the stomach tube into American Medicine is due Philip S. Physick, Professor of Surgery in the University of Pennsylvania. Physick published his paper in 1812 [81] entitled "Account of the New Mode of Extracting Poisonous Substances from the Stomach."

He declares that he employed the tube in washing the stomach of twins three months old who had accidentally been given an overdose of laudanum by their mother. He employed a large flexible catheter for this purpose. It was passed into the stomach and a drachme of diluted ipecac was then injected with a syringe. He then withdrew the fluid contents of the stomach through the syringe and injected warm water, which was again withdrawn. As a result one of the children was saved, the other died. Physick states that the idea of washing out the stomach with a syringe and tube in cases in which quantities of laudanum or other poisons had been swallowed occurred to him at least twelve years before, and he had constantly for many years recommended it in his lectures. In the year of 1809 his nephew Dr. Dorsey practiced lavage in a case, but the patient had swallowed the poison twelve hours before he was called, so that he did not succeed in saving life.

Of interest in this connection is a letter published by Physick in the same volume of The Eclectic Repertory, page 380.

"To the Editors of the Repertory:

> "When I sent you the communication published in the first number of the third volume of the Eclectic Repertory, descriptive of what I supposed a new method of extracting poisons from the stomach, I was influenced by a desire to propose to my medical brethren a method of treatment which might preserve the lives of many unhappy persons who either

[81] Physick, P. S.: Eclectic Repertory & Analytical Rev., 3: 11, 1812.

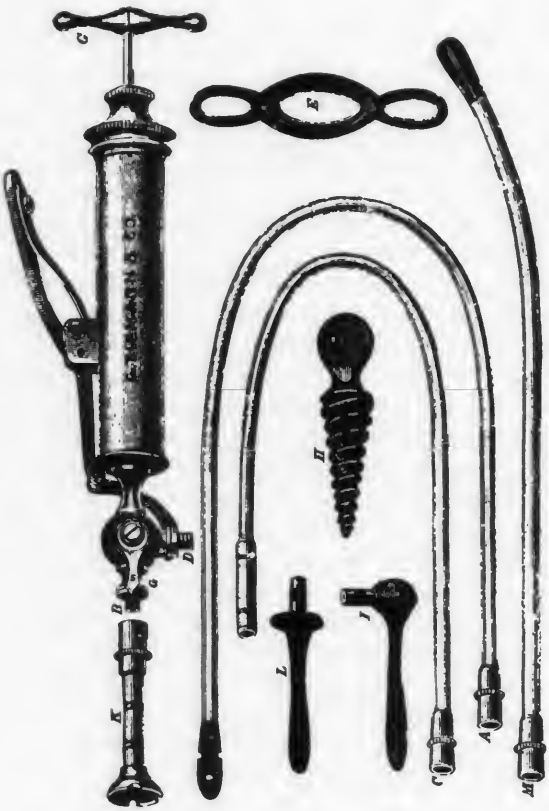

FIG. 2.

Taken from "Diseases of the Stomach." By John C. Hemmeter. Published, Philadelphia, P. Blakiston's Son & Co., 1902, page 125, titled: Stomach-Pump used only for Rapid Evacuation of Poisons.

by design or accident had swallowed large doses of laudanum or other poisonous substances. If in a single instance I had been instrumental in preventing death, I should have considered myself very happy; and to have withheld a communication which might have been attended with such beneficial effects, would have been in every respect unjustifiable."

"I have the pleasure of announcing to you and to your readers, that in several instances which have recently occurred in this city, the practice has been completely successful. In two cases treated by Dr. Dorsey, in which large quantities of laudanum had been taken, there is great reason to believe that no other mode of treatment would have succeeded in preventing the fatal event. Both patients were saved by injecting warm water into their stomachs and extracting it again, together with the laudanum, by means of a syringe. I therefore am happy in having called the attention of the profession to a mode of treatment not before used in this country, at least within my knowledge; but I have now an act of justice to perform, in ascribing the merit of the invention to Doctor Alexander Monro, Junior, of Edinburgh, who published it in his inaugural thesis, in A.D. 1797. Of this circumstance I was entirely ignorant when I sent you my paper, and probably should still have remained so, had it not been mentioned in his book of Morbid Anatomy, a work which has but very lately come into my hands."

PHILIP SYNG PHYSICK.

Philadelphia, 20th January, 1813.

Physick's priority as to the discovery of the stomach tube was apparently vigorously contested, for Mathews,[82] in a publication entitled "Description of an Improved Instrument for Extracting Poison from the Stomach with Some Statements Tending to Establish the Validity of Doctor Physick's Title to the Credit of having Invented the Stomach Tube" after describing a syringe of his own attempts to prove as the results of certificates signed by three

[82] Mathews, C. B.: Medical Recorder, 10: 322, 1826.

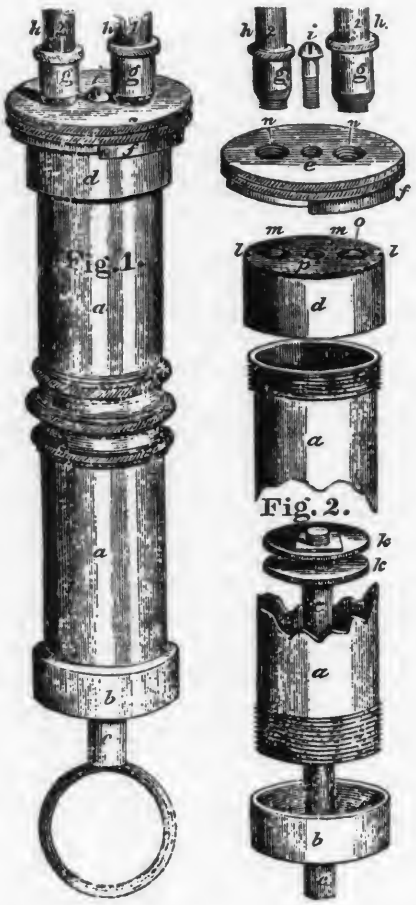

FIG. 3.

Taken from The Medical Recorder, 10: 329, 1826.

"Description of an Improved Instrument, for Extracting Poison from the Stomach; with some statements tending to establish the validity of Dr. Physick's title to the credit of having invented the Stomach Tube." By Caleb B. Mathews, M. D.

physicians in 1820, that Doctor Physick recommended the introduction of the tube into the stomach in order to extract poisonous substances in his lectures as early as 1802, 3 and 4 and that he exhibited a tube covered with elastic gum in 1805, 6, and 7 brought to him by Doctor Dorsey from Paris. Mathews expresses surprise that under these conditions priority should have been claimed by Jukes, Bush and others in London as late as 1822. However, the controversy was by no means limited to this country but was even more vigorous and raging in England where contention ran high as Jukes, Bush, Evans and Reed each claimed priority for the discovery about the same time.

In May 1822, Jukes,[83] an English surgeon published a paper on a " New Means of Extracting Opium from the Stomach " in which he describes an instrument which he termed " stomach pump " " for removing by mechanical agency poison from the stomach." He described his apparatus in detail; it consisted of a flexible tube ¼ inch in diameter, 2½ feet in length, tipped with an ivory globe and containing several perforations at this end. The other extremity was attached to an elastic bottle. The bottle was filled with warm water and following the introduction of the tube into the stomach, the fluid was likewise forced in and again withdrawn. Jukes had experimented on dogs introducing laudanum into the stomach and then withdrawing it by means of his apparatus, but continuing lavage until the water extracted had become clear. He was bold enough, too, to swallow as great an amount as 10 drachms of laudanum on one occasion and had it withdrawn by means of lavage by his friend Mr. James Scott without experiencing any deleterious effects. Jukes demonstrated his method of lavage of the stomach upon himself to Sir Astley Cooper and his class at Guys Hospital.

A few months apart during the same year both Bush [84] and Jukes published papers on this subject in the same journal. Bush's appeared in September and Jukes in November. Each described his

[83] Jukes, E.: London Medical & Physical Journal, 48: 384, 1822 and London Medical Repository, 18: 361, 1822 also see Sir Astley Cooper's Address-Lancet, 1: 300, 1824.

[84] Bush, F.: London Medical & Physical Journal, 48: 218, 1822.

apparatus for purpose of lavage of the stomach in cases of poisoning. Bush's instrument also consisted of a flexible tube of sufficient length to enter the stomach, but the use of a syringe instead of an elastic bottle was advised. He termed his apparatus a "gastric exhauster." Jukes insisted immediately on the priority of his discovery.

Shortly after this Evans [85] published the report of a case of poisoning by opium in which the stomach was emptied by mechanical means with a stomach tube. This was accomplished in 1817 but the case, however, was not reported until 1823 following the publication of Jukes and Bush.

As a further development in the chain of events a new instrument for the evacuation of the stomach was demonstrated by Mr. Reed [86] of Hosmoden Lane, Kent, to Sir Astley Cooper and interested physicians at Guys Hospital on November 21, 1823. "Mr. Reed was in the theatre during the whole of the time and superintended the use of the instrument; on quitting he received the unanimous applause of those present. Sir Astley Cooper, just after the experiment had been tried, looking at what had been removed from the stomach, said that the instrument would do well for an alderman after a city feast."

The important improvement in the Reed instrument was in the special syringe, so constructed with two valves, that the need of removing the syringe in the process of gastric lavage could be avoided.

About the same time Weiss,[87] an instrument manufacturer, developed and patented a new type of pump for the following purposes: (1) for emptying the stomach of poisons, (2) for removing water in drowning before applying artificial respiration, (3) for giving enemata.

The apparatus was widely used especially in Germany and many references are made to it in the German and English literature. Soon thereafter a communication appeared in the Lancet from

[85] Evans, D.: Transactions of the Associated Apothecaries and Surgeon-Apothecaries of England and Wales, 1: 208, 1823.

[86] Reed, J.: Sir Astley Cooper's Address, Lancet 1: 276, 1823 and Lancet, 7: 158, 1825.

[87] Weiss, J.: Lancet, 8: 191, 1825.

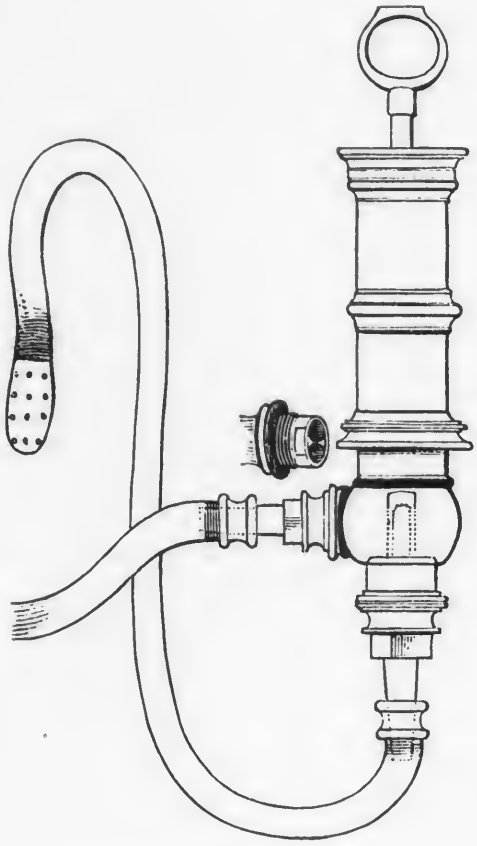

FIG. 4.

Taken from The Lancet, Vol. I and II, page 471, 1823-24,
"To the Editor of The Lancet." By W. Wansbrough,
Jan. 20, 1824.

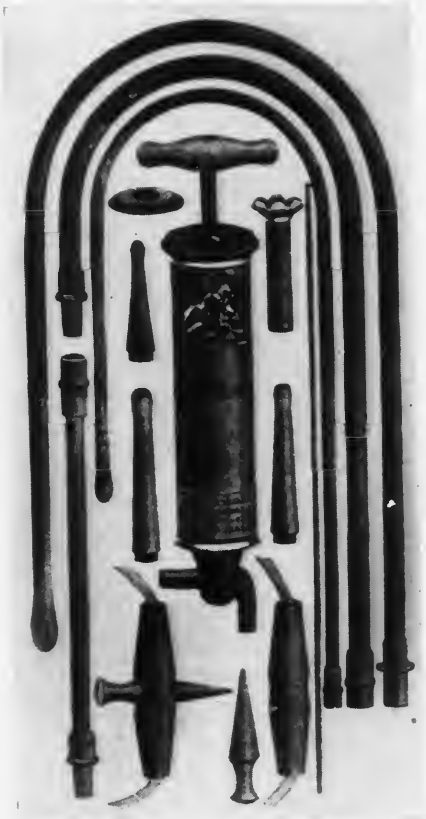

FIG. 5.

Taken from Med. Klin., 21 : 394, 1925, "Über die vor 100 Jahren von John Weiss hergestellte Magenpumpe."
By Dr. W. V. Brunn.

Alcock [38] addressed to the editor in which he decried the comments of approbation so warmly expressed by Sir Astley Cooper at the occasion of the demonstration of Jukes given upon himself of gastric lavage for the removal of poisons from the stomach by means of the stomach tube as "inaccurate or erroneous." "I assume," he states, "that your statement must be erroneous, as it is calculated to convey the idea that the mechanical removal of poisons from the stomach was altogether new and solely established by that experiment. I am therefore induced to offer these remarks in justice to my professional brethren and to obviate the stigma which must attach to them if they could be supposed to be ignorant of the mode of treatment above alluded to many years after its practicability had been demonstrated and published to the world."

Alcock then calls attention to the compliments extended to Mr. Reed by Sir Astley Cooper following his demonstration of the use of his stomach pump, praising his ingenuity and remarking that "so far, alone, it was of most valuable importance to the profession as well as to humanity at large."

From the foregoing statements Alcock seems assured that far greater significance has been accorded to the claims of Jukes, Bush and Reed than was justly due them and that in the dispute for priority between them regarding the invention of an apparatus for extracting poisons from the stomach none had an actual right to this claim for the "same apparatus was proposed by Boerhaave and brought to perfection by Dupuytren and Renault in France." The whole apparatus as described by Mr. Jukes may be seen in Orfila's Toxicology, Vol. 1, Sec. 84, 1819. It is of interest to note that in spite of these convincing statements to the contrary, Jukes [39] still maintained his claim of priority as late as 1832 and while Sir Astley Cooper likewise at first credited this achievement to Reed he was quite willing later to admit that Jukes was the actual inventor of the stomach pump.

There are always difficulties encountered in any attempt to establish the validity of priority in medicine as the development of a discovery is often so gradual and frequently enveloped in a series

[38] Alcock, T.: Lancet, 50: 282, 1823.
[39] Jukes, E.: On Indigestion & Costiveness, 3rd Ed., p. 187, London, 1932.

of events gathered from many sources, that it may become impossible to name any single individual who should receive the entire credit. This is especially so regarding the discovery of the stomach tube.

Sudhoff maintained in considering the discovery of the circulation of the blood, that an individual cannot be considered a discoverer or an inventor by simply contemplating some new idea, but can only attain this goal when by purposeful experimentation beginning with an idea he can establish proof of it in true scientific form and place it beyond all doubt.

Garrison [40] in his admirable paper on the history of gastric intubation states "In the textural history of medicine, however, the law of priority is that credit in each case shall be given preferably to the author of the first published record of the discovery or invention."

If we apply these criteria formulated by both Sudhoff and Garrison as evidence in evaluating the priority in regard to the discovery of the stomach tube, it is quite clear that Boerhaave was the first to suggest the use of a flexible tube to be passed into the stomach as a method of treatment but there is no evidence that he ever employed it for this purpose. In 1776, however, John Hunter suggested the use of the stomach tube and in 1790 reported its use as a method of alimentation in a case of paralysis of the muscles of deglutition. Renault and Dupuytren in 1803 published the description of a tube which they had perfected and Alexander Monro, Jr. in 1797 likewise suggested the use of a tube and syringe as a suitable means of extracting poison from the stomach; it does not appear, however, that any practical application of this apparatus was made in cases of poisoning or other conditions.

Philip Syng Physick advised lavage of the stomach with a tube and syringe in 1800, but his first publication only appeared in 1812. The reports of Jukes, Bush, Evans and Reed appeared later (1822) and therefore need not be considered in determining the matter of priority. Physick has been commonly acknowledged as the discoverer of the stomach tube especially in this country and one of us [41]

[40] Garrison, F. H.: Boston Med. & Surg. Jour., 174, 267, 1916.

[41] Friedenwald, J.: Bull. Johns Hopkins Hosp., 14: 243, 1903 and Bull. Univ. Maryland, 10: 176, 1926.

has formerly maintained this view and published a paper to this effect. His publication appeared in 1812 although he employed the tube in 1800. Our attention, however, has been directed through the splendid little volume of Robertson [42] and by a personal communication from the author that this honor should be accorded to John Hunter. Robertson has now so definitely established this fact that further controversy is beyond question and we are anxius to express our appreciation to him for directing our attention to our error. Further evidence that the credit of this discovery of the stomach tube is due John Hunter is established by the fulfillment of the criteria of priority formulated by Garrison. It is of some interest that although Physick had been acknowledged in America as the inventor of the stomach tube, he, however, accorded the merit of this invention to Doctor Alexander Monro, Jr. of Edinburgh [26] (*loc. cit.*). On the other hand, it is rather surprising, as has been pointed out by Robertson [43] that although Physick was engaged in Hunter's Clinic for two years from 1789 to 1791 and held the appointment as house-surgeon to Hunter during the year 1790 that he made no reference whatever to Hunter's case of dysphagia in which the tube was employed although this occurred in 1790, the identical year in which he occupied this position.

In summary the conclusion is arrived at that John Hunter was the inventor of the stomach tube and was the first to make use of it in England; that the tube was first introduced into America by Physick and in France by Dupuytren and Renault. Following the rival claims of priority by Jukes, Bush, Reed and Evans and the appearance of the important publication of Alcock which followed in 1823, the tube was soon forgotten and was not generally employed until 1869, when Kussmaul in his classic publication suggested its use in the treatment of gastric dilatation.

Only a few publications of note appeared in the interim, that of Somervail [44] in 1823, Arnott [45] in 1829, both advising syphonage as a method of performing gastric lavage instead of by suction.

[42] Robertson, J. D: Gastric Acidity, Middlesex Hospital Press, 1931.
[43] Robertson, J. D.: Personal Communication.
[44] Somervail, A.: Medical Recorder, 1823, p. 583.
[45] Arnott, N.: Elements of Physics or Natural Philosophy, General and Medical. Revised American Edition with additions by Isaac Hays, Phila., Lea and Blanchard, 1845, p. 466.

While up to this time the stomach tube had been largely employed mainly for gastric lavage in cases of poisoning Lefèvre [46] in 1842 advised this procedure with an emolient decoction in instances of life threatening vomiting and later Canstatt [47] in 1843 advised this method of treatment in cases of dilatation of the stomach in order to empty the stomach of retained contents; however, there is no evidence whatever that he actually employed this procedure.

Kussmaul [48] published his observations in the *Deutsches Archiv für Klinische Medizin* in 1869, in which this very ingenious method of treatment laid the foundation for an exact means of diagnosis in gastric disturbances. In this valuable paper Kussmaul describes difficulties encountered in the treatment of advanced forms of dilatation of the stomach due to stricture of the pylorus.

He remarks: "very exceptionally was it possible to obtain any results in the treatment of this dreadful disease. As a rule it may hardly be possible even to expect an amelioration of the symptoms, and never possible to produce a cure." Kussmaul, who was director of the Freiburg Medical Clinic, was rather reluctant in admitting to his clinic a country girl, Marie Weiner, twenty years of age, who had been troubled with gastric disturbances for eleven years, and in whom he found a typical example of dilatation of the stomach, produced by stricture at the pylorus due to ulcer. The patient was very pale and emaciated, and so weak as to be unable to leave her bed; she suffered greatly from vomiting of extremely large quantities; from gastric pain, sleeplessness, and attacks of tetany and was relieved of her suffering only by means of morphine. Kussmaul says: "Often when I observed the patient in the wretched prodromal stage of vomiting the thought had occurred to me that I might relieve her suffering by the employment of the stomach-pump, as the removal of large masses of decomposed acid gastric contents should cause relief from agonizing burning and retching at once. The introduction of the sound could be performed without difficulty, for where a gastric dilatation has existed for so long a period of

[46] Lefèvre: Archives Générales, 1842.
[47] Canstatt, C.: Specielle Pathol. und Therapie, Erlangen, Vol. 4, p. 382, 1843.
[48] Kussmaul, A.: Deutsch. Arch. f. Klin. Med., 6: 455, 1869.

time the esophagus is usually dilated. The artificial emptying of the stomach by the pump could be no more painful or distressing than the condition existing before and during vomiting; at any rate, its effect would be more rapid and complete than the emptying of the stomach by means of vomiting, with its prolonged prodromal stage of nausea, pain and retching. By means of the pump it is possible to empty the stomach completely, and if its elastic and contractile powers have not been entirely lost, perhaps even give to it the tone to contract to a certain degree.

"In our patient the gastric dilatation was occasioned by stricture at the pylorus. It appeared to me as though the excessive distention, the filling and overloading of the stomach itself, produced a mechanical action which increased the constriction of the pylorus to complete closure. I was desirous of removing this condition by emptying the stomach and decreasing its size. Finally, it appeared to me that the use of the stomach-pump would permit a more thorough treatment of the diseased gastric mucous membrane than was ever before accomplished. In the case of our patient this had for two and a half years been constantly irritated by extremely acid contents. The stomach-pump would not only make it possible completely to evacuate these acrid masses, but would permit the washing and cleaning of the diseased mucous membrane which had been irritated by acids with alkaline fluids.

"The introduction of the stomach tube, the pumping out, and washing were usually easy. We withdrew three liters of acid, dirty-gray, sarcina-containing fluid, with particles of food of all kinds undergoing softening and decomposition." This was first accomplished on July 22, 1867.

Although most enthusiastic over this new method of treatment, Kussmaul recognized its limitations. He realized that only when slight constriction of the pylorus existed was he able to obtain a cure in cases of dilatation of the stomach by lavage. In malignant stenosis of the pylorus and in cases of cicatricial contraction relief only could be afforded, and not cure. He says: "Naturally it is impossible to expect a cure of a dilated stomach by means of lavage when the pyloric orifice is narrowed to such an extent that it will hardly admit even as much as a goose quill." It is here that Kuss-

maul points out the possibility, that surgery would at some future day bring relief to these cases, and it is possible, as Fleiner suggests, that perhaps it may have been the inspiration of this remark that led Billroth at a not very distant date to attempt to cure intractable forms of gastric disease by surgical measures. Thus a new method of treatment, this epoch-making work of the great master Kussmaul, furnished the impetus for the study of gastric diseases according to modern scientific methods and led to the stomach-tube, not only as a new method of treatment but also of diagnosis.

Kussmaul draws attention to this interesting fact that the pump employed for gastric lavage was manufactured by an instrument maker Fisher for Doctor H. Reich according to Kussmaul's directions and was patterned after the syringe of Doctor M. Wyman and described by Doctor H. I. Bowditch [49] for cases requiring paracentesis for removal of pleuritic effusions.

Great credit is due Kussmaul who was the first to publish a definite method of treatment by means of gastric lavage for dilatation of the stomach and thus by creating renewed interest in the stomach tube established the beginning of modern methods of diagnosis and treatment of diseases of the stomach.

Since it was soon discovered that as the result of suction with the stomach tube trauma was often produced sufficient to withdraw bits of gastric mucosa from the stomach, syphonage, which had already been advised by Somervail and Arnott was again introduced by Ziemssen,[50] Rosenthal,[51] Rosenbach,[52] Hodgen,[53] Leube,[54] and Jürgensen.[55]

Jürgensen likewise recommended a soft rubber tube and explained the method of introduction of the stomach tube, the position to be assumed by the patient as well as the method of practicing syphonage. This contribution must be classed as a distinct advance in the therapeutics of gastric diseases. Jürgensen utilized the rubber tube

[49] Bowditch, H. I.: Am. J. Med. Sci., 23: 320, 1852.
[50] v. Ziemssen, H.: Deut. Arch. f. Klin. Med., 10: 65, 1872.
[51] Rosenthal, L.: Berl. Klin. Wochensch., 7: 287, 1870.
[52] Rosenbach, O.: Deut. Med. Wochenschr., 1876.
[53] Hodgen: St. Louis Med. & Surg. Jour., July 10, 1870.
[54] Leube, W. O.: Die Magensonde, Erlangen, 1879, p. 28.
[55] Jürgensen, T.: Deutsch. Arch. f. Klin. Med., 7: 239, 1870.

terminating in a perforated ivory ball. The bulb was guided by means of a wire stylet.

In order to more readily facilitate gastric lavage double recurrent stomach tubes were now constructed by both Auerbach [56] and Ploss.[57] However, these were soon found impractical due to their large size and Hemmeter [1] later developed a more useful tube of this type. It was after but an interval of five years, that Ewald [58] and Oser [59] introduced the soft rubber tube independently of each other which was to be passed without the aid of a mandurin. Ewald demonstrated, by chance that if a rubber tube was sufficiently firm it could be introduced without difficulty. In a patient who had swallowed prussic acid with suicidal intent and who was brought to Frerich's clinic, evacuation of the stomach had to be accomplished immediately. A stiff tube was not at hand and Ewald proceeded at once to remove a piece of rubber gas tubing, rounded off the sharp edge and cut out two eyelets. The tube was oiled and although the patient was unconscious he succeeded in passing the tube into the stomach.

Ewald and Oser were therefore the first to demonstrate that the soft rubber tube could be easily introduced into the stomach without the aid of a mandurin. While Kussmaul drew attention to the therapeutic value of the stomach-tube, it remained for Leube [60] at the Rostock Naturforscher Versammlung in 1871 to point to the value of the stomach-tube as a diagnostic measure and also to emphasize the fact that it is impossible to arrive at a proper conclusion concerning the nature of gastric conditions without the use of this instrument.

Twelve years later (1883), Leube [61] established his test meal as a means of determining the state of motor sufficiency of the stomach, concluding that a normal stomach should be empty seven hours after the ingestion of a meal of soup, broth, steak, and bread.

[56] Auerbach: See Jürgensen, T., Deutsch. Arch. f. Klin. Med., 7: 244, 1870.
[57] Ploss: Deutsche Klinik, 22: 69, 1870.
[58] Ewald, C. A.: Irish Hospital Gazette, 2: 254, 1874 and Berl. Klin. Wochenschr., 12: 3, 1875 and 23: 33, 1886.
[59] Oser, L.: Wien. Klinik., 1875 and Wien. Med. Presse, 18: 4, 1877.
[60] Leube: Die Magensonde, Erlangen, p. 69, 1879.
[61] Leube: Deutsch. Arch. f. Klin. Med., 33: 3, 1883.

This test of Leube's is recognized today as a most valuable means of determining variations in the motor function of the stomach. Leube also at this time analyzed the gastric secretion obtained through the stomach tube, by utilizing mechanical influences as for instance from the irritation produced by the prolonged use of the tube; by chemical influences, the ingestion of soda-water; and by thermic stimulation in swallowing ice-water. Riegel [62] (1881) showed the difficulties encountered in obtaining gastric juice by stimulating the gastric secretion by means of ice water, according to the method of Leube, as but minimal quantities are thus obtained. He therefore advised the withdrawal of the gastric contents through the tube after his well-known test dinner of soup, beefsteak, bread and mashed potatoes and also established the fact that the most favorable time for removal is at the height of digestion. He demonstrated here, too, that the absence of hydrochloric acid is a usual occurrence in cancer of the stomach even though this acid is at times absent in other conditions.

In their classical work on the "Physiology and Pathology of Digestion" (1885-1886) Ewald and Boas [63] presented their experiments regarding the appearance of free hydrochloric acid and lactic acid in the stomach contents obtained through the tube and also drew attention to other important factors connected with the chemistry of gastric digestion. Ewald here fully described his test breakfast and presented its advantages as well as its importance in the diagnosis of gastric disease. The expression method of obtaining gastric juice is also described and was adopted as the simplest method of obtaining this secretion.

A further significant advance was made by the introduction of duodenal intubation, the possibilities of which are still in their infancy and are constantly widening. The first attempt at recovering duodenal secretion was undertaken by Boas [64] in 1889, who was occasionally able to obtain duodenal contents by introducing the stomach tube in the fasting state following massage of the right upper abdomen. Boldyreff [65] could likewise at times obtain this

[62] Riegel, F.: Die Erkrankungen des Magens., 1897, p. 83.
[63] Ewald, C. A. & Boas, J.: Virchows Archiv., 101: 325, 1885.
[64] Boas, J.: Zentrabl. f. Klin. Med., 10: 97, 1889.
[65] Boldyreff, W.: Pflügers Archiv. f. d. ges. Physiol., 121, 13, 1907-08.

secretion by administering a fatty meal after which regurgitation of bile and duodenal contents would occur into the stomach.

Hemmeter [66] was the first to actually attempt instrumental intubation of the duodenum though Turck [67] had previously claimed to have succeeded in accomplishing this by means of his so-called "gyromele" which was primarily intended to outline the boundaries of the stomach by the aid of palpation over the abdominal area. Hemmeter passed a balloon into the stomach, which was then inflated; following this a rubber tube was inserted over a groove on the upper surface of the balloon and was thus guided into the duodenum. His method, however, proved to be difficult and impractical.

It was not until 1909 that the duodenal tube of the present day type was introduced independently by both Einhorn [68] and Gross.[69] The tube was afterward modified by Rehfuss [70] and others but these simply represent variations of the original Einhorn model. All consist of small soft tubes with tips so weighted as to rapidly pass into the duodenum. A modification of importance is the tube introduced by Levin [71] in 1921 consisting of a smooth catheter entirely of rubber without the addition of a metal tip. It has the great advantage in that it can be inserted both through the nostril as well as by mouth.

In the introduction of the duodenal tube another new era in the advancement both as to diagnosis and treatment in gastro-enterology was inaugurated.

While duodenal intubation was at first employed only for purposes of securing duodenal secretion it was soon recommended for duodenal and intestinal lavage. A further advance was made when Lyon [72] in 1917 instituted his method of non-surgical biliary drainage by means of the duodenal tube with a solution of magnesium

[66] Hemmeter, J. C.: Bull. Johns Hopkins Hosp., 7:79, 1896.
[67] Turck, F. B.: New York, Med. Jour., 53: 191, 1896.
[68] Einhorn, M.: Med. Rec., 77:98, 1910.
[69] Gross, M.: N. Y. Med. Jour., 91:77, 1910 and 93, 171, 1911.
[70] Rehfuss, M.: N. Y. Med. Jour., 100:374, 1914.
[71] Levin, A. L.: Jour. Am. Med. Asso., 76, 1007, 1921.
[72] Lyon, B. B. V.: Am. J. Med. Sci., 153:469, 1917; Am. J. A. M. A., 73:980, 1919.

sulphate. This procedure is now successfully practiced both as a diagnostic as well as a therapeutic measure. Fractional gastric analysis so commonly utilized nowadays have likewise been made possible by means of the duodenal tube.

Duodenal intubation is now recognized as an extremely valuable measure in nourishing patients affected with certain digestive disorders associated with nausea or persistent vomiting. It has also been found very useful in the treatment of certain forms of peptic ulcer.

The duodenal tube is now largely employed following surgical procedures for purposes of aspiration of gastric and intestinal contents and for introducing fluids and nourishment into the digestive tract, for overcoming persistent vomiting and distention and is likewise a valuable measure in such conditions as gastric dilatation, ileus and localized peritonitis.

Continuous suction can be practiced through the tube and has been especially helpful in special types of intestinal obstruction as well as an aid following operative procedures for intestinal obstruction. The literature pertaining to duodenal intubation has become extensive and innumerable publications have appeared during the past years describing many important developments related to the digestive processes, in health as well as in disease, in which this tube has played a significant role. It would be beyond the confines of this paper, however, to attempt to supply even an outline of this extensive literature. Among the important contributors in this field other than those already referred to are Jutte,[73] Palefski,[74] Simon,[75] Soper,[76] Buckstein,[77] Smithies,[78] Ward,[79] White[80] and Paine and Wangensteen.[81]

One cannot dismiss this historical sketch without a brief word

[73] Jutte, M. E.: Med. Jour., 95: 543, 1912.
[74] Palefski, I. O.: Interstate Med. Jour., 21: 977, 1914.
[75] Simon, Sidney: Southern Med. Jour., 14: 447, 1921; Am. J. Surg., 12, 267, 1931.
[76] Soper, H. W.: J. A. M. A., 97, 771, 1931.
[77] Buckstein, J.: J. A. M. A., 73: 670, 1919.
[78] Smithies, F.: Annals of Med., 1: 553, 1921.
[79] Ward, R.: Calif. and West. Med., 31: 395, 1929.
[80] White, Franklin W.: Boston Med. and Surg. J., 186: 206, 1922.
[81] Paine, J. R. and Wangensteen, O. H.: Surg. Gyn. and Obstr., 57: 601, 1933.

regarding another type of tube through the introduction of which important diagnostic information regarding disturbances of the esophagus and stomach has been obtained, namely, the esophagoscope and gastroscope.

Kussmaul [82] in 1868, was the first to attempt gastroscopy. He employed a rigid tube which he was able to insert into the stomach, but could not visualize this organ satisfactorily. Miculicz [83] was the originator of the modern instrument. He was enabled by means of this instrument which was constructed somewhat on the type of the cystoscope to actually visualize the interior of the stomach.

In 1895 Rosenheim [84] developed a new type of gastroscope which was further improved by Rewidzoff [85] in 1897 and still further by Kelling.[86] Chevalier Jackson [87] modified this instrument which was further improved by Sussman.[88]

On account of the difficulties encountered in manipulating these instruments successfully, gastroscopy was abandoned until 1922 when Schindler [89] developed his new instrument. This was, however, difficult to insert due to its rigidity and not until 1932 did he announce his newly constructed flexible tube which can be inserted without great difficulty or danger and by means of which an exceedingly satisfactory view of the stomach can be obtained. The development of esophagoscopy has been greatly aided by the instruments devised by Killian,[90] Hill,[91] Jackson,[92] Einhorn [93] and others. It has enabled the gastro-enterologist to visualize all portions of the esophagus and thus has been of great value as a method of diagnosis and has likewise materially assisted in direct treatment as

[82] Kussmaul: See Killian: Deut. Arch. f. Chir., 58: 499, 1901.
[83] Miculicz, J.: Wien. Med. Presse, 22: 1410, 1881.
[84] Rosenheim, T.: Deutsch. Med. Wochenschr., 21: 740, 1895.
[85] Rewidzoff, B. K.: Berl. Klin. Wochenschr., 5: 484, 1899.
[86] Kelling, G.: Lancet, 1: 1189, 1900.
[87] Jackson, Chevalier: Med. Rec., 71: 549, 1907.
[88] Sussman, M.: Therap. d. Gegenw., 52: 433, 1911.
[89] Schindler, R.: München. med. Wochensch., 69: 535, 1922; 79: 1268, 1932.
[90] Killian, G.: Deut. Zeitschr. Chir., 58: 499, 1901.
[91] Hill, W.: Brit. Med. Jour., 2: 1096, Nov. 1909.
[92] Jackson, Chevalier and Jackson, C. L.: Bronchoscopy Esophagoscopy and Gastroscopy, W. B. Saunders Co., Phila., 1934.
[93] Einhorn, M.: N. Y. Med. Jour., 66: 796, 1897.

in the removal of foreign bodies, the direct application of remedies as well as in the removal of specimens for microscopic examination.

And thus we conclude a chapter in the history of the stomach tube from the earliest times beginning with the pinna and stomach brush to the present day tube with its modern improvements and many-sided accomplishments.

The development of the tube into its present form portrays in a large measure the great advance made in our knowledge of digestive diseases. The interesting papers of Major [94] and of Paine [95] also bear this out.

As in other specialties in medicine instruments of precision have often played a major role in their development, so too in gastroenterology, the tube has assumed a similar role. It is possible that in the future as in the past, it will continue to lead the way to still further achievements in our knowledge of digestive diseases.

[94] Major, R. H.: History of the Stomach Tube, Annals of Med. History, 6: 500, 1934.

[95] Paine, J. R.: The History of the Invention and Development of the Stomach and Duodenal Tubes, Annals of Int. Med., 8: 752, 1934.

SAMUEL JOHNSON AND DR. ROBERT JAMES

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To the persistence of James Boswell the world owes much of its knowledge of Johnson's miscellaneous and fugitive prose. He was ever alert to the possibility that a dignified preface or a felicitous dedication might be by Johnson, and he was not unwilling to verify his guess by a direct accusation of authorship. In one instance, indeed, he seems to have repeated himself: perhaps he forgot that Johnson had already acknowledged the dedication to John Kennedy's *Complete System of Astronomical Chronology,* for in 1776 Boswell again recorded in his Journal that he had discovered that Johnson was the author of that dedication. Later, when Boswell began to prepare his *Life of Johnson* for the press, he entered in his Journal, 13 July 1786, "I went to Malone's and with his assistance traced Dr. Johnson's publications chronologically through the *Gentleman's Magazine,* and wrote their titles down under each year." Of course there were some mistakes and some omissions in that evening's work, yet it remains the basis for all study of Johnson's early writings.

But when he considered the difficulties involved in any attempt to discriminate Johnson's contributions to the three bulky folios of Dr. Robert James's *Medicinal Dictionary,* Boswell wisely gave up. He knew that Johnson had furnished the dedication and had helped with the Proposals, and in two passages in the *Life* he pointed out that Johnson had also contributed to the text. His only comment, however, was this: "I have in vain endeavoured to find out what parts Johnson wrote for Dr. James. Perhaps medical men may." Whether any medical men have ever made serious attempts to discover Johnsonian articles in the *Dictionary,* I do not know; even the name of its author is now unknown to many a practitioner both in England and in the United States. Mark Twain once looked through the volumes, and his essay, *A Majestic Literary Fossil,* is even yet amusing reading. As he looked through the numerous case histories which are a feature of the work, it will be recalled, he

was rightly depressed by the uniformity with which all the patients "dy'd," no matter whether the disorder necessitated a mild purgative or a major operation. I myself am even less a medical man than Mark Twain, but for lack of a more wholesome occupation I have from time to time turned the pages of Dr. James's folios, with considerable interest in Johnson even if with little knowledge of medicine. These volumes are not without interest to a student of the history of printing and publishing, but we are now concerned only with Johnson's contributions to the text.

In the *Literary Supplement* of the London *Times* (13 December 1928) Dr. R. W. Chapman called attention to one article that Johnson had furnished in the text of the *Dictionary*. For the *Gentleman's Magazine* in 1739, Johnson had written a life of Boerhaave; this was reprinted in the *Dictionary,* with some additions which, in Dr. Chapman's judgment, were not Johnsonian. I think that from a study of the text as it stood I should have concurred in his opinion, but there were some curious facts connected with the problem. In the first place, the text of the article in the *Dictionary* was reprinted by Davies in his edition of Johnson's *Miscellaneous and Fugitive Pieces,* 1773. This was a puzzling circumstance, since normally the *Gentleman's Magazine* would be much more accessible than this entry hidden in the middle of Dr. James's first volume. For other biographies, furthermore, Davies used the *Gentleman's Magazine:* Johnson's life of Sydenham, for instance, was reprinted by Davies from the *Gentleman's Magazine* rather than from the *Entire Works* of Sydenham, in which the life had first appeared. Hence there must have been a real reason for Davies's neglect of the original version of the life of Boerhaave in the *Gentleman's Magazine,* and the best guess seemed to be that Davies had been told of the enlarged version in the *Medicinal Dictionary.* In the second place, the life of Boerhaave was reprinted from the *Dictionary* in the *Universal Magazine* for February and March, 1752, but there was one wholly new section. (It may be well to explain that, aside from slight variations in the different texts, the important distinctions are as follows: to the basic text in the *Gentleman's Magazine,* there are added in the *Dictionary* and in Davies's text short criticisms on Boerhaave's *Institutes,* his *Aphorisms,* and his *Chemistry,* in that

order; the text in the *Universal Magazine* includes criticisms on the *Institutes, Aphorisms, Indexes,* and *Chemistry,* in that order.) The problem seemed to grow more complicated the more I considered it. In the *Universal Magazine,* by the way, some fifteen of Johnson's *Ramblers* were reprinted as Occasional Letters, without acknowledgment, in 1751-3. The contributor who submitted the life of Boerhaave to the *Universal Magazine* signed himself 'Medicus,' which of course might mean Dr. James or perhaps Johnson himself; it was difficult to believe that anyone else would copy the life from the article in the *Dictionary* in order to submit it to the *Universal Magazine.* Furthermore, there were now six extra paragraphs about the *Indexes* to take into account. In this additional section, too, was a thoroughly Johnsonian remark, it seemed to me:

> Men who want Merit themselves, are only fond of stripping others of theirs, and raising a short-liv'd Character upon the Ruins of real and uncontested Worth.

For a long time I was unable to understand what had happened; then, in the article 'Botany,' which I had already assigned to Johnson for other reasons, I discovered the six paragraphs about Boerhaave's *Indexes.*

It seems to me, therefore, that the enlarged biography is the authentic text: no one but Johnson himself, or a man like Dr. James who knew the work and the authorship, would be likely to combine the short criticism on the *Indexes,* hidden in the article 'Botany,' with the revised biography under the entry 'Boerhaave.' One or two slight revisions in the *Universal Magazine* may be changes consciously made by Johnson.

But there is more to be said concerning Johnson's articles in this *Dictionary.* The last page of Dr. James's long historical preface contains a short paragraph explaining the scarcity of biographical articles other than those under the letter 'A,' and a list of biographical articles is printed. Throughout the preface, however, Dr. James makes references to the proper biographical entries in the text, and it therefore seems needless to repeat any list here, unless he intended to bring together a special group of articles. We should of course expect Johnson's contributions to deal chiefly with the

biographical part of medicine,[1] and it is tempting to hope that Dr. James has here given a special list of Johnson's articles. I do not think it can be argued, though, that this list was drawn up specifically to acknowledge his indebtedness; for one thing, Boerhaave is not listed. It is perhaps true, indeed, that this paragraph contains most of the Johnsonian contributions, but only because in defending his method of dealing with the biographical part Dr. James happened to mention a list of articles by Johnson, who dealt principally with the biographies.

Here is the list as Dr. James prints it: Actuarius, Aegineta, Aesculapius, Aetius, Aretaeus, Albucasis, Avicenna, Averroes, Avenzoar, Archagathus, Asclepiades, Ruysch under ' Anatome,' chemists in the article ' Chymia,' and the biographical part of the article ' Botany.' I shall consider these articles in some detail, but it seems wise first to describe Johnson's method of biography. Almost all the early lives in the *Gentleman's Magazine* were direct translations, interspersed with occasional Johnsonian reflections. The life of Boerhaave, for example, was taken from the commemorative eulogy in Latin by Albert Schultens. The life of Morin, ascribed to Johnson on internal evidence by Boswell, is a translation from the French of Fontenelle. I place a few characteristic changes in parallel columns to show his method.

Fontenelle	Johnson, *Life of Dr. Morin*
mais le mérite seul agit lentement, & c'est même beaucoup qu'il agisse.	but mere unassisted Merit advances slowly, if, what is not very common, it advances at all.
À la fin cependant on fut forcé de lui rendre justice.	At last, however, Justice was done him in spite of Artifice and Partiality; but his Advancement added nothing to his Condition, except the Power of more extensive Charity.
Il échapperoit un nombre infini de ces sortes d'observations à un homme plus dissipé dans le Monde, & d'une vie moins uniforme.	What Numbers of such Remarks had escaped a Man less uniform in his Life, and whose Attention had been extended to common Objects?

[1] Compare this paragraph from Johnson's *Proposals* for the *Medicinal Dictionary*, 1741: 'As an Inquiry after those who have contributed to our Advantage, is not only the Consequence of a natural Curiosity, but of a laudable Gratitude, the

With such characteristic elaborations as a guide, it is interesting to turn to the life of Tournefort, printed under the article ' Botany.' The changes seem to me unmistakable, and I have no hesitation in asserting that this translation is by Johnson. (I quote the original of Fontenelle's *Éloge* from the *Histoire de l'Académie Royale des Sciences* for 1708.)

Fontenelle	*Life of Tournefort*
[not in original]	When we observe any Man distinguish'd by a superior Knowledge, or Skill of any Kind, it is natural for the Mind to be solicitous and inquisitive about the several Circumstances which have concurr'd to render him thus conspicuous.
Il n'y trouvoit point la Nature qu'il se plaisoit tant à observer, mais des idées vagues & abstraites, qui se jettent, pour ainsi dire, à côté des choses, & n'y touchent point.	In Disquisitions of this Kind, instead of Nature, with whose Contemplation he was so highly charm'd, he found only vague and abstracted Ideas, which decoy and amuse the Mind, without enriching it with any thing that is solid and satisfactory.
Mais la destination naturelle prévalut.	But in his Breast *Botany* could not endure a Rival, and the Bent of Nature was too powerful to be balanced by any Views, or overcome by any Byas.
[not in original]	But what Hardships will not a Mind, actuated with an ardent and insatiable Desire of Knowledge, undergo for Satisfaction?
ne demande que des opérations d'assés peu de mouvement.	demands only such Operations as may be perform'd without a great deal of Exercise, Toil, and Fatigue.
Elle veut que l'on coure les Montagnes & les Forêts, que l'on gravisse contre des Rochers escarpés, que l'on s'expose aux bords des Précipices.	The Botanist must wander thro' Mountains and Valleys, range the gloomy Forests, climb the steepest Rocks, and expose his Life on the Brinks of hideous Precipices, in Quest of Knowledge.

History of Physicians, being an Account of the Lives, Writings, and Characters of the principal Authors in Physic, will be inserted in the Work, as their Names occur in the Alphabet.'

La Patrie d'un Sçavant ne seroit pas sa véritable Patrie, si les Sciences n'y étoient florissantes.	The native Country of a genuine and unfeign'd Virtuoso would be but a dull and uncomfortable Scene to him, if the Sciences did not thrive and prosper in it.
La dispute fut sans aigreur, & même assés polie de part & d'autre, ce qui est assés à remarquer. On dira peut-être que le sujet ne valoit guère la peine qu'on s'échauffât.	The Dispute on both Sides was manag'd not only without Bitterness, but even with a certain graceful Air of Decorum and Politeness, which bespeak Candour, and a Love of Truth. It may possibly be said, that the Subject was not of sufficient Moment to ruffle their Spirits, or inflame their Passions.
non ceux qui voyagent simplement, mais ceux en qui se trouve & une curiosité fort étenduë, qui est assés rare, & un certain don de bien voir, plus rare encore. Les Philosophes ne courent guère le monde, & ceux qui le courent ne sont ordinairement guère Philosophes, & par-là un voyage de Philosophe est extrêmement précieux.	not the Man who runs from one Country to another, without knowing what he is about, or entertaining the least Thought of rendering himself wiser and better; but the Man who attentively views Nature in all her Variety of Shapes, with a View to become useful to his fellow Creatures, and treasure up a grateful Store of Knowledge in his own Mind; so that the faithful Accounts of the Travels of a real Philosopher may be look'd upon as sacred Archives of inestimable Value.
les chemins les plus battus.	the most beaten and patent Roads.

These selected passages are intended only to indicate the method of the translator. I do not think that I have been unfair in my selections, even though I have endeavored principally to demonstrate Johnson's workmanship; I believe that a careful study of the complete text and a comparison with Fontenelle's *Éloge* will prove even more convincing. If the life of Tournefort is by Johnson, one immediately wonders how much more of the article 'Botany' is likewise his work. I have already indicated that I accept as Johnson's six paragraphs about Boerhaave's *Indexes,* from the middle of this article. Now it may cause mild amusement to think of myopic Samuel Johnson as the author of a text book of historical botany, yet I do not suppose that he was any less qualified than Dr. James

to turn over the volumes of the great botanists and to extract a brief historical sketch of the growth of the science. I reproduce two passages from the System of Tournefort to illustrate the continuance of the Johnsonian manner.

> The Botanists therefore bethought themselves of inventing a Method proper for the Removal of this Grievance; but it must be own'd, that few of them apply'd themselves to this Discovery; that those who did, were pretty late in doing it; and that others disputed either the Possibility or Usefulness of such a Method. But 'tis no uncommon thing to see the Progress of Learning retarded by the Learned themselves. . . .
>
> As in all this the express Design is not exactly to follow or imitate Nature (who, in the Production of Vegetables, seems not to have been very solicitous about a System) but only to establish an arbitrary Plan for facilitating the Knowledge of Plants, the Goodness of any Method invented for this Purpose cannot be so properly prov'd by philosophical Reasonings, as by the Advantages it brings along with it; its Clearness and Perspicuity, and the Delight and Satisfaction that may possibly be found in it; and upon these Principles we must judge of the Sufficiency and Perfection of Mr. *Tournefort's* System.

But I must confess that the last pages of the article 'Botany' seem less Johnsonian. It seems to me likely, therefore, that he prepared only the historical and biographical part, as far as the recto of leaf 10 E1. I have no doubt that there was collaboration in both parts of this article and in other sections of the *Dictionary,* but the early part of 'Botany' is predominantly Johnson's. Perhaps it will now be easier to understand the help that Johnson gave on botanical terminology in the translation of the *Systema Vegetabilium* of Linnaeus in 1783.

It is now time to turn again to the list of biographical articles that Dr. James so thoughtfully provided at the end of his preface. Some of these are taken directly from other books, so that it is impossible to prove that Johnson transcribed them, though he may well have

done so. Four articles, 'Albucasis,' 'Avicenna,' 'Averroes,' and 'Avenzoar,' are taken wholly from Freind's *History of Physic,* and when that is said, nothing more can be said about authorship. Each of the other articles seems to me to show some traces of Johnson's manner.

Actuarius. This is certainly by Johnson. One sentence, I think, will prove it:

> That he obtained the Honour of this Title [Actuarius], is almost the only Incident of his Life, of which any Knowledge has descended to our Times; but his Works, which remain, afford sufficient Testimony, that he was not exalted beyond his Merit, and his Dignity was not the Veil of Ignorance, but the Distinction of Knowledge.

Aegineta. It happens that this was the only article (except for the life of Tournefort) which I had identified as Johnson's before I looked at Dr. James's preface. I still think it is by Johnson; here is the third paragraph:

> That Reputation of every kind is capriciously distributed cannot but be frequently observed; nor is it less usual for Authors, than for Men of every other Class, to be recompensed for their Endeavours in a Manner disproportioned to their Merit. Paulus [Aegineta] is, in the Opinion of Dr. Freind, one of those unfortunate Writers who have been long rated below their Value, and been despised for want of being read.

Aesculapius. This article is drawn principally from Daniel Le Clerc's *Histoire de la Médicine,* but there are occasional reflections in the Johnsonian manner. One cannot feel certain about the authorship, but it may well be by Johnson. One interesting sentence is this:

> The Accounts we have of the Grecian *Aesculapius* are much more ample, but equally uncertain, and perhaps more fabulous, it having been the Custom amongst the Greeks, to rob the Egyptians of their Mythology, and to disguise the allegorical Meaning with Fictions of their own.

Aetius. This is chiefly a direct translation of Photius's account of Aetius. At the beginning is a discussion of his Christian faith; this sounds a little like Johnson.

Aretaeus. This is a translation from Le Clerc's *Histoire de la Médicine.* The method used is exactly like the translation of the life of Tournefort, and I have little hesitation in ascribing this article to Johnson. I quote two short passages:

Le Clerc	Johnson
Cette opinion étoit, sans doute, venue de quelque superstitieux qui s'étoit attaché à écouter les rêveries de ces malades, & à les vouloir expliquer, ou à y chercher quelque sens.	This Opinion seems to have been originally broached by some weak and superstitious Trifler, who listened to the incoherent Reveries of Patients of this Kind, and endeavoured to find out a Sense and Meaning in them.
aux maigres.	to those who were lean and extenuated.

Archagathus. This is also from Le Clerc, and what I have just said about the article 'Aretaeus' may be applied here. For example:

Le Clerc	Johnson
telle que l'on a supposé que les premiers hommes la pratiquoient.	which we may well suppose to have been practised by the Infant World, when Men made their first Appearance upon it.
Voici quelques particularitez touchant la manière dont il s'y prenoit.	He had some Peculiarities in his Practice, which, if they will not inform the Judgment, will, at least, excite the Laughter of every thinking Person.

Of the remaining articles I have little to say. 'Asclepiades' is another of the translations from Le Clerc, very probably by Johnson. The discussions of 'Anatome' and 'Chymia' do not seem on the whole to be Johnsonian. It may be that further study would show additional Johnsonian articles, for it is a large work, and I have dealt with a part of the first volume only. The biographical entries in the later parts of the *Dictionary,* however, are fewer and shorter. One more biography that is surely by Johnson is the article 'Alexander.'

One other slight literary connection between Johnson and Dr. James, thirty years later, may be mentioned in conclusion, inasmuch as it involves another bit of Johnson's 'lost' prose. Shortly before the death of Dr. James in 1776, the formula of his fever powder (a home remedy that was as well known and generally used in the eighteenth century as aspirin is to-day) had been called in question by a Mr. Hawes, and a violent controversy ensued. Dr. James prepared a long *Vindication* both of his own character and of the fever powder, with affidavits and testimonials of various kinds, but before this was ready for publication, Dr. James died. The question of publication seems to have been left for decision to Francis Newbery, the agent for the sale of the fever powder. "Mr. Newbery called upon his friend Dr. Johnson, to consult him about the publication of this evidence, which the doctor thought absolutely necessary, and with great good nature sat down and added the following paragraph as a conclusion to the advertisement: 'The public will now be fully enabled to judge of Mr. Hawes' pretensions. . . .' This forcible appeal had its effect. It was unanswerable and unanswered."[2] Without doubt Newbery was quoting Johnson's concluding paragraph from a manuscript (which may still be in existence), but it has always looked as if this paragraph was omitted in the revision that was made before publication of the *Vindication,* in the eighth edition of the *Dissertation on Fevers,* 1778. I was not alone in the belief that this paragraph had never been published, but last year I found the text when, in a lucky moment, I was looking for other matters in the *London Chronicle.* In the number for 20 February 1777 (and frequently thereafter) is a two-column advertisement[3] with affidavits, concerning Dr. James's Powder. The last paragraph of this advertisement is Johnson's 'lost' conclusion:

[2] C. Welsh, *A Bookseller of the Last Century* (1885), pp. 138-40. The passage quoted is from Francis Newbery's Autobiography. See also Mr. L. F. Powell's revision of Boswell's *Life of Johnson* (1934), iii: 4, 389, 533.

[3] The same advertisement appears in the *Public Advertiser,* 19 February. This incident may serve to point out a danger that comes from too rash a generalization: 'advertisement' frequently means 'preface' in the eighteenth century, and I had assumed that Francis Newbery was using the term in that sense; but in this instance he used 'advertisement' to mean 'advertisement.'

> The Public will now be fully enabled to judge of Mr. Hawes's Pretensions to the Knowledge of this Medicine; and they will determine what Degree of Credit they ought to pay to the Assertions of a Man who has made so daring an Attempt to impose upon their Understanding; who, in Contradiction to Dr. James's Deposition, has represented himself as possessing a Secret with which he never was entrusted, and as having performed Operations at which he never was present; and who, to invalidate the Doctor's Testimony, has declared him "totally deprived of his mental Faculties,"[4] at a Time when the Vigour of his Mind was known and acknowledged by the Physician and Surgeon who attended him, and by Patients of the highest Rank, who continued to entrust him with Health and Life.

This vigorous defence, written and published a year after the death of Dr. James, may be allowed to conclude the story of Johnson's literary relations with his old schoolfellow, a relation that existed, without public acknowledgment, from the early studies in medical biography to this final defence of his dead friend's reputation. It was not inappropriate that, on the fascia of the Newbery house, 65 St. Paul's Churchyard, at the sign of the Bible and Sun, three medallions were carved: the faces were those of John Newbery, first vendor of the fever powder, Oliver Goldsmith, a stubborn believer in its efficacy, and Samuel Johnson, its public but anonymous defender.

[4] In later advertisements this quotation mark is misplaced at the end of the paragraph. Instead of this quotation from Hawes, Mr. Welsh prints 'has declared him to be reduced to fatuity.' (There are no other differences between the two texts, save in spelling and punctuation.) It seems to me certain that Johnson wrote this form, so much more vigorous than 'deprived of his mental faculties,' and that Francis Newbery later decided to judge Hawes out of his own mouth, by quoting exactly from his attack on Dr. James.

TEXTS AND DOCUMENTS

SOME EXTRACTS FROM GALEN'S "ANATOMICAL PROCEDURES"

TRANSLATED BY

OWSEI TEMKIN AND C. LILIAN TEMKIN

In 1933 and 1934 I demonstrated the Galenic method of dissection to first year students. For this purpose I chose several chapters from Galen's "Anatomical Procedures" describing the dissection of the thoracic organs. In the seminar I read our translation of the text aloud, while a student performed the actual dissecting following the instructions in the text. This had the further advantage of acquainting the students with Galen's involved and repetitious style. I used the cadaver of a monkey on the first occasion, that of a pig on the second, both animals often used by Galen himself, who did not dissect human bodies. Since I have been approached several times with inquiries concerning Galen's anatomical methods and knowledge, and since the experiment proved interesting and instructive to the students, I thought it worth while to publish parts of our translations. We have added a few more passages from the same work in which Galen describes the course of anatomical studies and the care to be taken in dissecting.[1]

O. T.

[*General instructions as to the order of dissection and the diligence of the anatomist.*] [2]

[Kühn II, page 226, 3-227, 2] [3] As I have said, it is necessary to observe the nature of all the bones whenever you can, either in the body of man or of a monkey and better still in both, and then to proceed to the dissection of the muscles. For these two parts have

[1] Readers who are interested in a more general exposition of Galen's methods and knowledge may be referred to the second volume of Max Simon's "Sieben Bücher Anatomie des Galen" etc. Leipzig, 1906, and to Friedrich Ullrich, "Die anatomische und vivisektorische Technik des Galenos." Diss. Leipzig, 1919. The English reader will find a general outline of the "Anatomical Procedures" in J. R. Coxe, "The writings of Hippocrates and Galen. Epitomised from the original Latin translations." Philadelphia, 1846. Some passages have also been translated by A. J. Brock, "Greek Medicine," London and Toronto, 1929, p. 160-165. Cf. also J. Walsh, "Galen's Writings and Influences Inspiring Them," III, Annals of Medical History, N. S. 7, 1935, p. 428 seq.

[2] For this part the reader ought to compare the passages translated by Brock, l. c.

[3] Anatomical Procedures, book 1, chapter 2.

been laid beneath all the others like cornerstones. Afterwards you can study whatever you like first: arteries, veins or nerves. And while you are engaged on the dissection of these parts you will also get information about the nature of the entrails and furthermore you will acquire knowledge of the intestines, the fat and the glands. But again it is necessary to examine all these parts in more detail by themselves.

This is the order in which it is better for you to train yourself. But if one is going to demonstrate, one must prepare one's specimen differently. One must lay it bare as quickly as possible and demonstrate it in several ways, each varying according to the purpose—as I shall expound. And if you lack monkeys, you had better be prepared to dissect the bodies of other animals, defining at the outset in what they differ from the monkey; for I shall explain this too.

[Kühn II, p. 230, 17-231, 3] [4] A man who is training himself in anatomy must do everything carefully; he must even remove the skin himself. For my predecessors, entrusting the skinning of the monkeys to others, as I did too in the beginning, failed to recognize eight muscles.

. . . . . .

[Kühn II, p. 232, 10-233, 11] All over the animal are to be found many such things which have been neglected by the anatomists. They disdained to dissect accurately, but rather announced what seemed to themselves most probable. Therefore one need not wonder at the number of things unknown to them in the living animal. For in their contempt they passed over those things which only a careful anatomist can see. Did they ever take the trouble to make a section themselves, or themselves to put ligatures around parts in the living animal in order to learn which function is thereby injured? Now at first one of the servants used to skin the monkeys for me too, since I shrank from this task and considered it beneath me. But when I once found a small piece of flesh in the region of the armpit, floating upon and somehow connected with the muscles of this region, and when I did not succeed in fitting it into any of

[4] Anatomical Procedures, book 1, chapter 3.

them, I deemed it better to skin another monkey accurately. After having drowned it in water as I am in the habit of doing, so that no part of its neck may be crushed, I endeavored to take off only the outer skin, without touching any of the underlying parts.

[*Dissection of thorax; demonstration of pleura, pericard and heart in situ.*] [5]

[Kühn II, p. 589, 1-591, 2] [6] In this book it is our task to describe the manner in which to undertake the dissection of the respiratory organs. Since, however, the remarks which I made at the beginning of the last book on the food vessels,[7] are equally valid for these organs, there is no need to write them again; but it is necessary for the present subject that every reader have them in mind.

Now the lungs and heart and thorax are the most important organs of breath and after these, two classes of arteries. The one class spreads from the left cavity of the heart into the whole body, and all these arteries beat in the same rhythm as the heart; they have one thing like a stem in common: the "greatest artery." [8] Some call it accordingly "the greatest," others simply "the great," others "the thick," others "the upright." The other class is that of the so-called "rough" arteries: [9] the one in the neck is the largest and it has many branches over the whole lung. On the upper end of the said great artery in the neck lies like a head, the so-called larynx. This part is also called "head of the bronchus" by the younger anatomists, because they call the whole trachaea not only thus, but also "bronchus." And nature created all these organs in accordance with the highest reason: the one class because their use is necessary to life itself, the other class because their use is advantageous although not necessary for the animal. These classes have been distinguished in Books 6 and 7 of the work "On the Utility of the Parts."

[5] All the following parts are taken from book 7 of the Anatomical Procedures.
[6] Anatomical Procedures, book 7, chapter 1.
[7] Anatomical Procedures, book 6, chapter 1, where Galen discusses the relation of function and morphological structure.
[8] i. e. the aorta.
[9] i. e. trachea and bronchi.

[Kühn II, p. 591, 3-595, 2][10] Besides these, however, nature constructed another part, of the same substance as the peritoneum, and rendering to all the organs of breathing the same services as the latter renders to those of nourishment. Just as this latter is called the peritoneum because it is stretched over all the food vessels, in the same way this is called "girdle" because it completely girds the ribs from within. And like the peritoneum it has also the two other names "membrane" according to some people, "cloak" according to others: "membrane" from the substance, "cloak" from the use. Quite thin, like a spider's web, consisting throughout of uniform parts, it girds the ribs; it is a garment, like a "cloak," for all organs of breath. The peritoneum, as has been said in the previous book, this membrane which is called "girdle," the leptomeninx, the periost, the membranes proper to the muscles, and the cloak of the heart are all membranes in a strict sense; but besides, there exist membraneous bodies in many parts: that which grows out of the bones after the nature of ligaments, that which arises from the aponeurosis of the muscles after the nature of sinews. This "girdle" moreover is stretched over all organs inside the thorax, as it was said and shown of the peritoneum with reference to the organs below the diaphragm. From it arise also the membranes which divide the thorax and only in this point does its structure differ from that of the peritoneum, in that it is exactly double, not single like the latter.

But you will learn its nature accurately if you split in the middle the front bone of the thorax which the anatomists call "sternum"; but for this it is well for you to have the so-called separating knives made both strong and sharp. And on beginning this task, you will of course first of all remove the bodies which surround the whole sternum. When this lies bare, you will strike more exactly the middle line. Directing your attention to this latter, cleave into two parts the whole breastbone up to the sword shaped cartilage, then go down into the depths as far as the backbone, separating the membranes from each other. And you will perform this more easily if you pull each of the parts of the sternum towards the outside, bending it with a steady hand. And when you do this, all

[10] Anatomical Procedures, book 7, chapter 2.

parts will follow easily except those in the region of the heart. For the membrane and cloak called "pericard" (for it is possible to name this too doubly: "membrane" from the substance, "cloak" from the use)' is bound closely to the sternum, chiefly by the apex and by certain parts at both sides of the apex.

You will meet the pericard at the moment when you cleave the sternum, above all, however, soon afterwards, when you separate from each other the membranes which divide the whole thorax by a partition. It is best of course to preserve it uninjured, but if you injure it, the pleura which is the concern of this dissection will not be destroyed. For even if the heart appears,[11] the cavities of the thorax will not be injured in the process. For often we ourselves deliberately laid bare the whole heart in the living animal, without piercing one of the cavities of the thorax. But this dissection will be spoken of later. Taking up the thread once more in the dissection with which we have now to deal, we say that one must try if possible not to injure the pericard, but even if it does become injured, the membranes which divide the thorax remain unimpaired. And this is the object in the present dissection. For each of the membranes will appear continuous in itself throughout, on the right as well as on the left of the thorax, lining the whole inner area of the ribs and the whole upper surface of the diaphragm. And it is also stretched over the lung, just as it was said that the peritoneum was stretched over all parts below the diaphragm. Further like the peritoneum, it spans in a circle the floating vessels; like the peritoneum, it stretches over the vessels along the backbone: over the biggest artery[12] which here lies beneath it, over the accompanying vein which nourishes the upper part of the thorax,[13] and finally over the esophagus. From here, extending to the sternum, the membrane runs double, as I have said.

[Kühn II, p. 595, 3-596, 7][14] The cloak proper to the heart, called pericard, exists apart from each of these.[14a] It lies between the

[11] The text reads (p. 593, 17) *εἰ μὲν γὰρ καρδία μὴ φανεῖται* which seems to be corrupt.

[12] i. e. the aorta.

[13] vena azygos?

[14] Anatomical Procedures, book 7, chapter 3.

[14a] i. e. the right and left pleura.

two, surrounded by them equally on both sides. And you will see this exactly in the dissection just mentioned, which took place on a dead animal. For in the upper parts which extend towards the collar bones, you will see the membranes which form the partition touching each other; but at the base of the heart, which some call the head of the entrail, the membranes meet the pericard, grow around it and accompany it as far as its apex—the pericard, like the heart, being conical in shape. Now its base, which is a ring, encircles the base of the heart; the apex of the cone, running parallel to the apex of the heart, grows together with the lower parts of the sternum, which end in the sword shaped cartilage. Admittedly, the pericard does not grow together with the body of the heart itself; indeed, the space between, devoted to the movements of the heart, is not small except at the base, which as before said is a ring, and where the pericard grows together with the vessels proceeding from the heart. This you will understand more exactly as soon as you either open up the entire thorax, or dissect the heart itself, after having extracted it from the thorax.

[Kühn II, p. 603, 15-605, 8] [15] In order that you may get to know the pericard accurately, you must cut out the whole sternum by the following procedure:—Pulling up the end of the sword shaped cartilage sharply by means of your fingers or of a hook, and bending it over, cut all the surrounding connection with the neighboring parts. When, proceeding thus, you have come upon the end of the sternum, deal similarly also around this, cutting indeed mercilessly that which is on both sides of it, but scraping the pericard from the parts beneath it with steady hand. In this manner ascend until you come upon the lower ends of the so-called thymus; continuing from these further up, you will strike vessels. Now if the animal has been long dead, you will not have a plentiful flow of blood even if you cut one of the vessels at this part, still more will this be the case, however, if it has not succumbed in any other way than from a cut throat. But if it is either freshly killed or strong blooded, some blood will flow down from the injured vessels towards the root of the pericard. You will also, it is true, be able to observe the specimen by cleaning it with a sponge, but it is better if

[15] Anatomical Procedures, book 7, chapter 6.

the work is performed without bloodshed. For this will make it possible for you to see everything more plainly, and especially the root of the pericard which does not proceed from the body of the heart itself, but from the vessels arising from it. Of these vessels one is the biggest artery,[16] situated of course on the left side; whereas the other on the right side is the vein ascending from the liver;[17] and besides these, there are two other vessels of which I have already spoken,[18] one of which I call "veinous artery," the other "arterial vein." And these you will see plainly even before the heart is laid bare of its cloak, but still more plainly, if you lay it bare. For thus will also the nature of the so-called bones be perceived by you, which indeed is seen clearly in the heart removed from the animal, but can also be perceived distinctly when the heart is still in situ.

[Kühn II, p. 605, 9-609, 3][19] Proceeding in the manner described you will furthermore perceive beside the things mentioned, that the heart is set up in the middle between the two cavities of the thorax. But its motion makes it appear as though it were situated more on the left side, for a double reason: because, namely, the pneumatic cavity[20] has been placed in this part of the animal and because the heart as a whole is somehow more inclined towards this part. For the apex is not, like the base of the heart, exactly in the middle between the left and right side of the thorax, since the heart does not extend straight downwards from its base to its lower end, but as I said, it inclines towards the left.

Although each of these things becomes apparent in the procedure just mentioned, it will do so much more plainly, if you cut out not only the sternum alone but together with it the cartilaginous parts of the ribs. But have for this task also, a strong and large knife, in order that you may with one blow sever them all in turn, aiming to cut chiefly where the bony nature of each rib first stops and the cartilaginous is produced. If you have observed beforehand in another animal, at which part of the ribs this point is placed, you will now be able to perform the operation, for it is extremely difficult to explain it exactly in words. Since, however, you will be

[16] i. e. the aorta.
[17] i. e. the vena cava.
[18] i. e. in Anatomical Procedures, book 7, chapter 4. Galen's "veinous artery" corresponds to the pulmonary vein, his "arterial vein" to the pulmonary artery.
[19] Anatomical Procedures, book 7, chapter 7.
[20] i. e. the left ventricle.

best prepared to approach the experiment if you are guided by a description, I am going to tell you. Each of the ribs proceeds obliquely downwards and forwards, taking its origin at the spinal column, for here it is connected by double joints to one of the thoracic vertebrae. Running in this manner, obliquely and with convex surface till it has completed that part of the thorax which appears most convex from outside, the rib takes from this point a certain turn. It does not any longer proceed downwards as it did at the start, for it climbs in the direction of the sternum. And here it has a different character too in that cartilage arises in the place of bone and that it can easily be cut with a sharp and strong knife. Such knives are to be found in the old writing tablets which are called kephalikai [21]; and the horse doctors have such knives also. But you too should have such knives at hand for the cutting of the cartilages, as you see them made also for me. And now cut the thorax in the manner indicated—(whereas in all other analogous parts this section ought to be performed as I indicated before with reference to the bones of the pubes and as I shall repeat in the next paragraph concerning other bones).

Now making a straight cut on both sides from top to bottom, lift out this whole part of the thorax as the cuts define it on both sides. This procedure I described a little while ago, advising that you start from the sword-like cartilage. But the position of all parts within the thorax (in the dead animal it is understood) becomes much clearer still if, after cutting out the whole breastbone together with the cartilaginous parts of the ribs, one bends back sharply those parts of the ribs connected to the vertebrae. For you see me too do this so forcibly, that often either some of the bones are broken or their ligaments with the spinal column are torn. And if you also proceed thus, it will be possible for you to see the parts of the thorax plainly and still more so if the diaphragm is cut away from the ribs, and better still, if you separate two ribs by cutting all the flesh between. Indeed this will be an absolute necessity when you dissect the parts of the thorax itself. For the parts around the heart, which constitute the subject under discussion, a section of this kind is not necessary, for it suffices, if the sternum alone together

[21] The meaning of this passage is not clear.

with the parts of the ribs adjoining it, is cut out. These parts, however, are cartilaginous and have a position opposite the bony parts. For the latter follow a bent course forwards and downwards from the spinal column, whereas the former, which begin in the manner explained by me, lead bent upwards to the sternum.

[Kühn II, p. 615, 12-618, 4] [22] But now, let us return [23] to the proper subject of this treatise, beginning with the auricles of the heart which our forerunners so named by reason of a certain similarity to the real ears. As these latter grow on both sides of the head, in the same way the auricles grow on the heart, obviously more sinewy and more skin-like in appearance than the body itself of the heart. For thus far it is possible to describe their peculiarity in words. But, as I said, it is better to trust such things to the senses of sight and touch, by which alone it is possible to recognize the colour and structures of a body. But these parts are also darker in colour and plainly similar to skin-like appendages for the purpose of forming a certain cavity before the heart. For this reason they have been made by nature both hollow and skin-like: hollow in order that cavities may arise, skin-like in order that they may follow promptly the movements of the heart, as has been expounded in the writing "On the Use of the Parts." They are two in number, one on each side of the vessels which conduct material to the heart: [24] on the right side, where the vein [25] joins the right cavity of the heart, on the left side at the mouth of the veinous artery.[26] And when you open these auricles, there will appear the body of the heart together with each of the above mentioned orifices and, in addition, the membranes which lie at each mouth, three over the right cavity, but two over the left, similar in their combined form to the points of missiles.[26a] Some of the anatomists have called them three-pointed. Indeed, you can observe this accurately when you have taken the heart out of the thorax. And you can observe also the two other

[22] Anatomical Procedures, book 7, chapter 9.

[23] In chapter 8 Galen had made a digression into the physiology of the heart.

[24] The auricles were not considered parts of the heart itself by Galen.

[25] i. e. the vena cava.

[26] i. e. the pulmonary vein.

[26a] In book 6, cap. 14 of "On the Use of the Parts," Galen explains that this comparison is not apt for the now so-called mitral valve. Cf. Ch. Daremberg, Oeuvres anatomiques, physiologiques et médicales de Galien, vol. I, Paris, 1854, p. 430, footnote.

orifices, those of the vessels which conduct material out of the heart: the orifice of the arterial vein [27] which conducts material out of the right cavity into the lung, the orifice of the great artery,[28] leading out of the left cavity into the whole body of the animal. On each of these orifices you will again see three membranes of sigma-like form,[29] which bend outwards away from the heart, as the three pointed ones bend towards the inside.

But before you take the heart out of the animal observe all branchings of the vena cava, (which will be discussed again in the anatomy of the vessels), the large gland called thymus and the root of the cloak of the heart. Observe also how the vein from the right cavity [30] reaches the spinal column, ascending to the fifth thoracic vertebra, and how this vein always reaches the same place in all animals on which I said that you were to practice anatomy. But not in all animals does it ascend from the right auricle, but this is the case in those animals in which the vena cava passes through the auricle [31] and ascends to the jugulum. To these animals the monkeys belong.

[*Preparation of an animal for vivisection of the thorax.*]

[Kühn II, p. 626, 19-627, 13] [32] The animal must be young so that you may succeed in cutting it with a scalpel without having recourse to a butcher's knife. It must be put on its back on a board. You can see many such boards prepared for my use, large and small, so that one can always be found which has the same proportions as the animal to be stretched on it. The board must have holes through which not only a thin string but thicker bodies too may be threaded with the utmost facility. One of the servants is to be instructed to throw four cords over the animal, one over each leg, as soon as it lies on its back on the board. He must thread the ends of the cord through and then tie them together. But if the animal has much hair on the breast it must be removed.[33]

[27] i. e. the pulmonary artery.

[28] i. e. the aorta.

[29] C, the Greek letter sigma.

[30] P. 617, 14/15: ἀπὸ τῆς κατὰ τὸ δεξιὸν οὔσης κοιλότητος. It is not clear what Galen meant by this "cavity on the right side."

[31] Galen considered the right auricle a kind of diverticle of the vena cava.

[32] Anatomical Procedures, book 7, chapter 12.

[33] A picture on the title-page of the Junta-editions of Galen's works illustrates this description. I have reproduced it in fig. 1.

FIG. 1. From the title-page of the Latin edition of Galen's works
Venetiis apud Iuntas, 1550.

TWO DOCUMENTS RELATING TO MEDICAL EDUCATION AT THE JOHNS HOPKINS UNIVERSITY

A Report by Daniel C. Gilman, First President of the Johns Hopkins University, and a Letter by Henry W. Acland, F. R. S., Regius Professor of Medicine in the University of Oxford

With an Introductory Note

by

ALAN M. CHESNEY, M. D.
(From the Johns Hopkins University School of Medicine)

It has seemed desirable, for two reasons, to reprint the two documents which form the basis of this communication. The first reason is that, taken together, they throw considerable light on the state of medical education of the time (1878), and the second reason is that they disclose what careful attention had been bestowed on the subject of medical education by President Gilman very early in his career as the first president of the Johns Hopkins University. That second reason of itself would not necessarily be regarded as of more than local interest were it not for the fact that a careful perusal of Mr. Gilman's report shows that the standards which he laid down for the preliminary preparation for the study of medicine in the Johns Hopkins University were not only considerably in advance of those prevailing in the country at the time, but in essence are the requirements in respect of the preparation in the sciences, which were later adopted for all the Class A schools of this country.

It is not the purpose of this communication to argue that the present requirements concerning pre-medical preparation now demanded of all applicants for admission to the Class A schools of this country were directly and solely the fruit of President Gilman's brain. The author is in no position to make such an assertion and the report itself shows that such was not the case. But it cannot be denied that the report reveals that President Gilman had given very careful consideration to the subject of the proper preparation for the study of medicine, had studied the situation in the English and

Scottish universities in particular, and had arrived at conclusions which are now generally accepted in the United States but were in advance of those of his contemporaries, to say the least.

The report by President Gilman was prepared for the Trustees of the Johns Hopkins University and privately printed for circulation amongst the members of that body. So far as I can discover it was never published in any of the University circulars, nor did it form a part of the regular annual reports of President Gilman. Excerpts from it are quoted in Fabian Franklin's Life of President Gilman [1] but that is the extent to which it seems to have been given general circulation.

The text of the letter from Dr. Acland clearly indicates how it came to be written, and throws additional light on the plans which President Gilman had in mind for the development of the Medical School when the time should come to organize it. A word about the writer of this letter would perhaps not be amiss.

Acland was 64 years of age when he visited Baltimore in 1879 and had been Regius Professor of Medicine at Oxford University for twenty-two years. Following his undergraduate work at Oxford he studied medicine first at St. George's Hospital in London and later at Edinburgh, and finally graduated in medicine from Oxford in 1846. He was appointed Lee's Reader in Anatomy at that institution and one year later was made Physician to the Radcliffe Infirmary.

In 1854 an outbreak of cholera occurred at Oxford and Acland was placed in charge of the situation. Through his skillful handling of the problem he achieved a reputation as a sanitarian and in 1857 he was made Regius Professor of Medicine. When the General Medical Council was constituted he was Oxford's representative on that body and was made President of it in 1874. He was personal physician to Edward VII when Edward came to Oxford as Prince of Wales and later was made a Knight Commander of the Bath. In 1890 he was made a baronet. He died at the ripe age of 85 years.

Acland was always a strong advocate of the inclusion of science

[1] Franklin, Fabian. Life of Daniel Coit Gilman. New York: Dodd, Mead & Company, 1910.

courses in the undergraduate curriculum and took a great interest in building up the collections in the Museum at Oxford. His thorough familiarity with the state of medical education in Great Britain at the time of his visit to Baltimore makes the comments in his letter all the more valuable.

ON THE STUDIES WHICH SHOULD PRECEDE A COURSE OF STUDY IN MEDICINE, HYGIENE, ETC.

A Report to the Trustees of the Johns Hopkins University.

Gentlemen: In reply to your request for a Report on the subject of studies, scientific and literary, preparatory to medical education, I beg leave to submit the following statements in respect to what is done here and elsewhere.

Let me first remind you of your own action in respect to this matter. From the begining you have never lost sight of the principle that, in the full development of this institution, the promotion of medical and sanitary science and of the sciences relating thereto should be an important part of our work. This idea has been repeatedly mentioned in our official publications, and no opportunity has been lost for securing counsel from eminent authorities at home and abroad. I may especially refer to the valuable suggestions given to us on this subject by Professor Huxley in his visit to this country two years ago, and to a course of lectures delivered by Dr. J. S. Billings, U. S. A., in the session of 1877-78.

Organization of the Medical Department Postponed

Thus far, however, as you are aware, no official steps have been taken for the organization of the medical department, and no inquiries have been instituted on our part, looking to the appointment of medical professors. You early determined to postpone the establishment of all professional schools (medicine, law, engineering, etc.,) until good provision had been made for instruction in those fundamental studies which are essential to a liberal education. You have accordingly first organized the classes in mathematics, physical and natural sciences, in ancient and modern languages, and in history, logic, philosophy, etc., and have brought together a company

of 116 scholars, who are now, at the beginning of our third year, engaged among us in scientific and literary pursuits. In the mean time, the construction of the Johns Hopkins Hospital has been making rapid progress, and its completion may be expected in the year 1882, unless some unexpected interruption of the work occurs. The plans of the hospital authorities include provision for a certain number of resident graduates or advanced students of medicine, and in other ways have regard to the promotion of medical science and education. I may add that the enlightened views which have guided the Hospital Trustees are attracting wide attention and approval, and have led to the hope and expectation that the conclusions of the University Trustees will be equally wise and liberal. It is clear that the time draws near for the University to determine what course it will pursue.

Discussions Elsewhere

Elsewhere during the last few years, the subject of medical education has been under constant discussion, and a large number of pamphlets and magazine articles have appeared in this country and abroad, suggesting changes in the existing systems. Improvements have been introduced in some of the chief American schools, and the attitude of the most enlightened members of the profession is favorable to still greater advances in the future.

Thus far, however, the discussion has chiefly related to the work of the medical student after he has entered upon professional studies, including such questions as these—what should be the subjects, the methods and the order of medical instruction, how much time should it cover, what laboratory facilities should be given, what should be the conditions of graduation, and what should be the rights and duties of the practitioner when he has entered upon his career.

Professor Huxley's Remark

There is, however, another point, of prime and antecedent importance, which has received but little consideration, and to this the attention of the Johns Hopkins University is now especially directed. I refer to the proper training which the medical scholar

should receive before he enters upon the school of medicine. It is conceded that now the ordinary medical student begins his work without any adequate preparation. I might quote American authorities for this statement, but to avoid all local coloring it may be better to present the views of two foreign writers of acknowledged acquaintance with the subject. In his address at Baltimore, in September, 1876, Professor Huxley spoke as follows, in respect to the training of young men who enter the medical schools of Great Britain; and what is true in that country is equally true among us.

"At present, young men come to the medical schools without a conception of even the elements of physical science; they learn, for the first time, that there are such sciences as physics, chemistry, and physiology, and are introduced to anatomy as a new thing. It may be safely said that, with a large proportion of medical students, much of the first session is wasted in learning how to learn—in familiarizing themselves with utterly strange conceptions, and in awakening their dormant and wholly untrained powers of observation and of manipulation. It is difficult to over-estimate the magnitude of the obstacles which are thrown in the way of scientific training by the existing system of school education. Not only are men trained in mere book-work, ignorant of what observation means, but the habit of learning from books alone begets a disgust of observation. The book-learned student will rather trust to what he sees in a book than to the witness of his own eyes."

Professor Lister's Testimony

So also Professor Lister, the celebrated Scotch surgeon, has recently spoken as follows:

"I have often observed that persons who have gone gradually up various steps of promotion at the London hospitals, for example, and come to occupy positions of authority, utter doctrines which are simply absurd, from ignorance of natural philosophy. Of course, we know that one of the properties of ignorance is that it is ignorant of its own existence, and the more ignorant a man is, the more dogmatic he commonly is; and the mischief done to medical edu-

cation for want of knowledge of natural philosophy in our medical men is exceedingly great. As regards our medical students, if we go beyond mechanics,—which is all that is now required,—we find the most gross, and grievous ignorance. You ask a man, for instance, with reference to an injury to the chest. I need not go into what sort of derangement may occur,—but you ask how it is that the air enters the chest, and many of our students have not even got so far as to know that nature abhors a vacuum. The evil is really most formidable, and these men come to be teachers of physiology, and they teach the most outrageous nonsense to our students."

But while this discreditable condition of affairs is admitted, very little has been done to remedy it. Two correctives are called for, and are quite within reach.

Need of An Entrance Examination

First, a standard of admission to medical colleges should be agreed upon, and every respectable institution should insist upon a real, and not a pro forma examination to be passed by every matriculant. This examination may of course be made by the scientific faculty of a college or University, and the certificate of that faculty may be accepted in place of an entrance examination to be passed before the Medical Faculty. Thus in a recent instance, the University of Edinburgh has accepted the certificate of the biological professor of the Johns Hopkins University in respect to one of his students, and allowed one year's good work with us in Chemistry and Biology to count for one year's work on the four years' curriculum in Edinburgh.

With all the obvious abuses to which examinations may lead, there is in our present circumstances no other method by which suitable candidates for the medical profession can be chosen, and the unsuitable eliminated. The reasons why this preliminary examination has not been instituted are well known. The medical colleges of this country are not suitably endowed; they are under no supervision; they are often mere private associations. Even when connected with honorable universities, it has been the custom in many places to speak of them as " outside departments " having no share

in the general fund which maintains the college proper. Hence the medical schools depend for their support upon the fees of students and are exposed to constant rivalry. Students are commonly graduated at the end of two or three years, and without any evidence being then required of a liberal, fundamental education.

Present Standard of Admission to American Medical Schools

To bring this matter before you more clearly, let me ask an examination of some of the latest announcements of medical colleges which I now lay before you.

So far as I am aware there is but one medical school in this country which requires any preliminary examination for entrance to its courses. This school requires a knowledge of easy Latin Prose, and elementary Natural Philosophy. Another school requires the same attainments to be exhibited before the candidates present themselves for examination in their medical studies. It is possible that like exactions may be made elsewhere but with these partial exceptions, I do not know of any medical school in the country which requires in the final or intermediate examinations any knowledge of French or German, or any other language, or any scientific training except that which is acquired in the professional school.

The consequence is that the medical schools are receiving young men who could not enter the lowest class of a respectable college, and young men who have had no preliminary training in scientific principles and who have done no work in scientific laboratories, are admitted to courses which require the most practised eyes, the most skilful hands, and the best disciplined brains.

Studies Antecedent to Medicine

The second corrective lies in offering and prescribing a course of study preliminary to medicine. Hitherto, the advocates of good fundamental education have advised young men to follow the ordinary college course and graduate as Bachelors of Arts before beginning medical studies. This was the natural advice when and where there was but one college curriculum, and even now, publicly

and privately, many of the advocates of improved medical education insists upon it that the B. A. degree should be recommended as the best introduction to a medical course. But in our country, at the present time, the degree of B. A. is by itself no more of a certificate than the degree of M. D. To ascertain its value, we must go behind the diploma, and ask by whom and for what this honor was conferred. There are worthless academic institutions as well as medical schools, and the sooner all scholars indicate the sources from which their diplomas are derived, the sooner will good diplomas be restored to their right offices, and poor diplomas be rendered worthless.

I am prepared to go even further, and to claim that the medical colleges should not only insist upon antecedent studies, but should insist upon it that these studies include a very large amount of attention to the natural sciences, and to the modern languages, and to psychology and ethics.

The B. A. Diploma, Indefinite: Something More Desirable

It is not the B. A. diploma which the medical colleges should exact, for this in the very best of our colleges may not indicate any training in the observation of nature whatsoever, and in fact commonly indicates the predominance of Greek, Latin and Mathematics, over all other studies. It is not the B. A. diploma which should be exacted,—but rather evidence that the aspirant for a medical education has already made a good beginning in the study of nature, with varied enough range of studies to cultivate all his faculties, and that he is familiar with the phenomena which Chemistry and Physics reveal, and their bearing upon Life, in the vegetable and animal kingdoms. Such opportunities are now abundant in Cambridge, New Haven, Ithaca, and many other places—though I know of only two institutions in this country, the Sheffield Scientific School, and the Johns Hopkins University, which offer and recommend definite courses of study in Biology as the proper introduction to the work of the medical college.

The Johns Hopkins University

First Step

I come now to the consideration of what you are doing to prepare young men to enter upon the medical schools. Beginning with the notion that prolonged training in the physical and natural sciences is fundamental; that an acquaintance with Latin, French and German is indispensable; and that other literary and scientific studies are important auxiliaries, especially those which are commonly called "philosophical," your first step was to select professors who could carry on these instructions. For the chair of Biology, a gentleman * was chosen who had been the pupil and associate of Huxley, Burdon Sanderson, Michael Foster, Ludwig, and other eminent physiologists, an assistant of Bastian in Pathology, and who in addition to his scientific attainments was a teacher of unusual skill. Among other courses which he had followed were those leading up to the degree of Bachelor of Medicine in the University of London. To the chair of Chemistry, a gentleman † was called who had received the degree of Doctor of Medicine in the College of Physicians and Surgeons in New York, and had subsequently passed six years in German universities, the last two as an instructor in Chemistry at Tubingen. In Physics, gentlemen ‡ were chosen who were not only thoroughly acquainted with theoretical and mathematical physics, but were skilful laboratory workers, fond of investigation and capable of leading others to investigate. Ample provision was also made for the study of Mathematics, Ancient and Modern Languages, Psychology, History, Literature, etc.

Second Step

Your second step was to provide laboratories and apparatus. Spacious apartments were constructed and adapted to the work of Chemistry, Physics and Biology. The instruments purchased were selected by these professors from the best makers of Great Britain, France, Germany and the United States. A shop for the construc-

* Dr. H. N. Martin.
† Dr. I. Remsen.
‡ Professors Rowland and Hastings.

tion of new apparatus was established. The sum of twenty-six thousand dollars was expended in instruments, exclusive of buildings and furniture. Sixteen thousand dollars were expended in books and periodicals.

Third Step

Your third step was to invite scholars by proposing, as one of seven courses which might lead to the degree of B. A., a course antecedent to medical studies. In this it was provided that the student's principal studies should be Chemistry and Biology, his subordinate courses should be Physics, Modern Languages and Philosophy.

Fourth Step

A Scheme of Study Antecedent to Medical Studies

All this was projected in our earliest conceptions of the university work. After two years of observation and trial, we were convinced that the plans were essentially correct, though capable of improvement in details, and accordingly it was determined to make some modifications and then announce the scheme in an expanded form. Accordingly, last July (1878), a Programme of Studies preparatory to medical studies was put forth and distributed, and a second edition will soon be published.

The essential parts of this scheme are these. The young man who enters it must be at least 16 years of age, and in addition to having a good English education, must have read some Latin prose, and must be acquainted with algebra, and with three books of Euclid, and with Plane Trigonometry. This it should be remembered is more than is now required for admission to any medical school in this country. He must then study here for three years or more and pass numerous examinations. A large part of his time will be passed in the laboratories of Physics, Chemistry and Physiology.

His course in Physics will include 225 exercises, (lectures, recitations and laboratory work); his course in Chemistry will comprise 300 exercises, most of which include several hours of laboratory work; his course in Biology will include the still larger number of 450 lectures and laboratory appointments, distributed somewhat

as follows: in General Biology, 20; in Comparative Anatomy and Zoology, 110 exercises; in Embryology, 25 exercises; in Botany, (at present), 24 exercises; in Physiology and Histology, 114 exercises; and in Human Anatomy, 160 exercises. This means constant hard work during three years for a scholar of health, industry and talent; it may require four years.

What ought the student to know at the end of these three years?

His mathematical studies will have included arithmetic and the elements of algebra, geometry and trigonometry and their applications in physics and mechanics.

He will have followed for a year * by lectures, recitations and demonstrations, a course of instruction in Natural Philosophy and will have had the opportunity of working with scientific instruments in the physical laboratory during the same period.

He will have attended for a year a course of lectures, examinations and demonstrations in Chemistry, and will have worked in the chemical laboratory four hours daily, during a year and a half.

In Biology he will have worked for a considerable part of two years, and will have pursued a thorough course of dissection and demonstrations both in comparative and human anatomy, and in physiology. The microscope will have been his daily help.

He will have a good command of English, and will have been taught Latin, French and German. He will read at sight ordinary books in the languages last named.

He will have been taught to draw from objects. He will have given some attention to Logic and Psychology, and will have had abundant opportunity, if his strength permit, to study other subjects. He will then be ready for any medical school in this country.

In presenting this scheme, as one which this institution can now honestly offer and recommend to young aspirants for the medical profession, we may hope yearly in the light of experience and criticism to make it better. Certainly it would be well to introduce instruction in Surface Geology or Physical Geography, including the laws of climate and temperature, the distribution of animals and plants, etc.; so, too, instruction in Botany, especially in Vegetable Physiology and Morphology, may be extended; there are questions

* The academic year includes eight months of instruction.

in social and sanitary science which it would not be inappropriate to study; higher literary criticism is also very desirable, likewise historical and political science; but the danger is that the three years' course will be too full, and certainly nothing should be allowed to interfere with the constant and prolonged observations of nature, and especialy of the phenomena of life.

Some have thought it might be desirable to mark the termination of this course by giving to successful students the degree of Bachelor of Medicine.—but the objection is strongly urged that the public may thus be misled. The casual observer may suppose that a medical training has been given in this course, where as it is scientific and literary, not medical,—and may as such be commended to those who would become naturalists, as well as to physicians. This argument seems conclusive. Perhaps the degree of Bachelor of Science will be thought appropriate. One gentleman has playfully suggested that if we were not fettered by traditional initials, the degree of F. S. M., " fit to study medicine," would tell the tale exactly.

Our Scheme Compared With That of Edinburgh, London, Etc.

Let us next compare our requirements with those of the University of Edinburgh, set forth in the Calendar for 1878-9. From this it appears that four examinations are there prescribed for the medical students, of which the last is professional, while the other three are on what we have called studies antecedent to medical studies.

In the preliminary examination, the student is tested in English, easy Latin, Arithmetic, three books of Euclid, Algebra through simple equations, and elementary mechanics (Blaikie's Dynamics). This is almost exactly our entrance examination.

Next he must pass in any two of the following subjects, viz: Greek (Xenoph. Mem. i.), French (one play of Moliere), German (Schiller's M. Stuart), Mathematics (Euclid i-vi, Algebra, Elem. Trigonometry, Conic Sections), Natural Philosophy (B. Stewart's Elements), Logic (Jevons or Fraser's Berkeley), Moral Philosophy (parts of Calderwood). Instead of the choice of two of these subjects, the Johns Hopkins University requires of all students

both French and German, nearly as much Mathematics as is mentioned above (omitting Conic Sections) more Natural Philosophy, besides Logic and Psychology.

The third group of examination subjects includes Chemistry, Botany and Natural History (Zoology). These subjects are taught here, and the aggregate time required for them is more than in Edinburgh.

Then comes the final or professional examination, beginning with Anatomy.

The Scotch University Commission recommends (Report of 1878) for the medical student in Scotland that there be a first examination in Latin, Greek and Mathematics, or in French and German, instead of Greek; an intermediate examination in Natural Philosophy, Chemistry, Physiology, Botany and Zoology, and a final examination in professional subjects.

The University of London, the degrees of which are justly esteemed, prescribes as the basis for medical studies, English and Latin, any two of the three languages, Greek, French and German, Arithmetic, Algebra through simple equations, four books of Euclid, Natural Philosophy, Chemistry, Physiology, Human Anatomy and General Biology.

The General Medical Council of London has recommended the following standard for a preliminary examination, for those who wish to be registered as students of medicine: English, Arithmetic, Algebra (through simple equations), Euclid (two books), Latin, including translation and grammar; and in one of the following subjects, Greek, French, German, Natural Philosophy (Mechanics, Hydrostatics and Pneumatics). After this professional education is to follow, and the examinations in Physics, Botany and Natural History are to precede the first professional examination.

A recent German writer claims that even in Germany instruction preparatory to medical studies is defective, because, in the antecedent gymnasia, (among other enumerated faults),

1. Drawing is so inadequately taught;

2. The mathematical studies do not touch upon actual physical and physical-physiological studies; and

3. Modern Languages (English, French and Italian) are neglected.

These points have not been lost sight of among us.

If it were desirable, abundance of testimony could be brought from other countries establishing these points. All this, however, is not a question of authority, but of common sense. Any university teacher of experience, any physician or surgeon in practice must acknowledge that the earlier the young medical student is put to the observation of the world in which he dwells the better, and as he goes on in intellectual attainments and strength, the more and more delicate and complex may be the subjects which he is taught to study. Beginning with the inorganic world and the laws of Chemistry and Physics, he may proceed to the effect of these laws upon the lower forms of vegetable and animal life, and so on up to their bearing upon the higher animals and Man and Society.

The B. A. Degree

The scheme of studies here proposed as antecedent to medicine may of course be followed in substance by those who matriculate in the university and proceed to the degree of B. A. Such candidates will have a more liberal culture in languages and mathematics. This additional preliminary training is now open to all who will receive it; it is urged upon all who can take it without detriment to their studies in natural science; it is recommended to those who are destined from their early youth to professional life, and who by favorable birth and opportunities are fitted to receive a long and thorough antecedent discipline; it may be thought best, at some future time, to require it of every student, (although this is doubted). If the question be asked why not insist that every one shall come up to this standard, the answer may be made that in the present condition of the country, it would be useless for this University to exact as introductory to three years of merely preparatory work higher qualifications than are now called for in the highest schools of medicine in this country, and especially, when youths who cannot even enter this preliminary course, may be admitted to a professional school and graduate Doctors of Medicine before their more educated comrades have completed our introductory studies.

The student has great advantages who pursues his scientific work in this University. There is here an atmosphere of study, exhilarating and strengthening. It is a place where many men of diverse pursuits, coming from every part of the country and from many different colleges, are engaged in advanced intellectual work. The best of books and journals and instruments are procured as required, and are freely accessible. Diligence, perseverance and earnestness are expected from all. There are examples among the teachers of those who have already won distinction, and yet are laboring as industriously as the youngest scholar. There are lectures and conferences and discussions on questions of literary and scientific importance, by which the mind is quickened and the intellectual scope extended beyond the limits of a craft or technicality. There is an abundance of encouragement for laboratory research.

DANIEL C. GILMAN,
President of the Johns Hopkins University.

Baltimore, December 2nd, 1878.

DR. ACLAND'S LETTER.

FRANCIS T. KING, ESQ.,
President of the Board of the Trustees of the Johns Hopkins Hospital, and

D. C. GILMAN, ESQ.,
President of the Johns Hopkins University.

BALTIMORE, September 27th, 1879.

GENTLEMEN:

I gladly comply with your wish that I should put upon paper the substance of the remarks which I should have ventured to make on Wednesday last at the opening of your University Session, had I not been necessarily absent by reason of a sharp, though temporary, indisposition. You had requested me, on that occasion, to state to your meeting the impression which the various documents relating to your University, a visit to its buildings, and a study of the plans

and structure of your Hospital on the spot and in your company, had made upon me.

To fully record these impressions would occupy much space; it would moreover be superfluous, inasmuch as my conclusions are, on the whole, in agreement with those which I believe to be your own, and those of far the greater part, if not at all, of the able administrators, your colleagues, who with you administer the noble, wise, and benevolent bequests of Mr. Johns Hopkins.

It is right that I should preface my remarks by saying that it is nearly two years since Dr. Billings visited me at Oxford, and explained your scheme. He then left with me the proposed plans of your Hospital, as well as the published documents explaining the views of the Trustees. It is in consequence of the great interest which his statements excited in me, on account of their relation to the whole subject of Medical Education, both in America and in Europe, that my present visit to the United States is largely due. Since I landed in America, I have had the great advantage of much conversation on the broad Questions of General and Medical Education, and of Public Health Administration, with various and valued friends in Boston, New York, Philadelphia, and Washington. I have moreover visited several Hospitals, old as well as recent, on this and my previous visit to the United States, in all these places, and lastly, you are aware that I have necessarily heard much on these questions, both at home and abroad, during the last thirty-five years, a period of unexampled progress and change.

With this preface, I venture to offer the following brief observations.

1st. I understand the object of Mr. Hopkins to have been to found in Baltimore, a University; and a Hospital, which is to be closely connected with the Medical School of the University.

2nd. It is impossible to exaggerate the importance to Medical Education in the future of such an intention and bequest, carried out with your present knowledge and experience.

Situated in an increasing City of three hundred and fifty thousand inhabitants, with extensive grounds (between 300 and 400 acres) splendidly situated, your University and your Hospital will have everything that opportunity and site can give. The moment

of the foundation is that of a crisis in Medical Education. The experience of the past, and the knowledge, the activity, and the appliances of the present, all combine to make your success in some line certain. The direction which that success will take, depends on the foundation which you now lay. There are already too many common medical schools. A school completely planned for certain important purposes does not exist. Such a School I understand you intend to found.

3rd. For the complete training of a scientific medical man, three distinct qualities of mind are needed:

(a). Those fostered by general literary culture.

(b). Those dependent on special scientific attainments.

(c). Those which come from close observation of the living sick, followed by, or accompanied with investigation of the dead.

4th. Each of these bundles of qualities is to be fostered, speaking generally, at a special period of life, by a special course of study, and with special opportunities.

They may, taken roughly, be called the School, the University and the Hospital periods. There is a tendency to draw a hard line between these. It is easy to show that this is an unnecessary, and even an injurious course for the best minds. Much time has been occupied in fruitless endeavors to decide whether Physics, Chemistry, Botany and Animal Physiology, any or all, should be in all cases confined to the school period, whether examination in all should take place at one time, or whether any or all should be left to the period of medical studies. What appears to be important is, that they should all be studied in a certain order, and that the due amount of acquirement in each should be tested at certain periods and in a certain order by unimpeachable examinations, written, oral, and practical.

5th. It may seem almost strange to remark that the amount of knowledge to be wisely required of Medical Students in their usual preliminary subjects, is as much matter of dispute as the period at which they should be examined for them. This appears generally to depend upon crude notions as to the end to be obtained in the Education of Medical Practitioners. These notions generally arise

from want of appreciation of the fact that some kinds of knowledge are requisite for the Science of Medicine as a whole, which are not requisite for any individual member of the Medical Profession, in order to enable him to possess the requisite knowledge and skill for the safe exercise of his Art. It would take long to illustrate this point fully, but it is highly important. Chemical, Physical, Biological, Pathological, and Therapeutical researches, and laboratories of the highest order, and involving much subdivision of labor are required for the progress of Medicine as a Science. Active practitioners may, it is true, be advanced Chemists, Biologists, or Histologists, as Prout, John Hunter and Bowman have been. It is better, therefore, once for all to say here, that in my judgment men of this kind are born with rare qualities which enable them to become what they are, and are not educated to it.

6th. But in the education of the masses of practising Physicians and Surgeons, the Organizers of Education, the Teachers, and the Examiners, should aim at two great objects—

1st. At securing that the Examinations demand of them mainly what they should know as Practitioners, and

2nd. At teaching them that which they are to be examined in, so that the full powers of the average mind be evoked in a manly way.

Does this statement seem to preclude the chance of securing a higher than an average standard within the profession, or stand in the way of training the abler students by a more thoroughly scientific method?

Certainly not. But it does imply better preliminary education, more expense, and larger time, than can be expected of, or be given by, the average class of youths who mean to follow the ordinary routine of practice, but not to act as the Teachers and advancers of Medical Science.

7th. It is not for me now to discuss how far the Trustees of Johns Hopkins University may hereafter seek to train a large number of students according to the standard of attainments of ordinary Medical Schools. They recognize that of the lower kind of schools there are more than enough, and they have decided on marking out a plan for training at present, only or chiefly, those who are able

and willing to devote themselves to the higher studies of Medicine and of Surgery, by such preparation as may be deemed by the Trustees essential to this end.

8th. They propose, I am informed, to require, firstly, that none shall enter on the scientific course till they have passed a good secondary School Examination, or a higher Matriculation Examination, and after the age of sixteen; secondly, that none shall enter on the final or practical course of the Hospital and Medical School till they have taken a degree in the Scientific department of the University, after a three years' course of study, or have exhibited attainments corresponding thereto; and thirdly, that whatever number of Medical students may be permitted hereafter to have the advantage of clinical instruction in the Hospital, there shall be a number of students holding Hopkins Scholarships and residing in the Hospital, who shall have passed all the Physical, Chemical and Biological Examinations required for this end.

9th. This method, carefully carried out, will insure a body of trained students, forming a "cadre" of a Medical School, such as cannot be excelled. This provision that no student should be allowed to act in a Hospital till he has been engaged for three years in Laboratory work in Physics, Chemistry and Biology, subsequent to a good general literary education, will be a new epoch in the History of Medicine.

10th. It would be superfluous for me to comment in detail on the three branches of Education—Literary, Scientific, Professional—as you propose to carry them out. Yet I may be allowed space for a few remarks on each of the great heads of your programme.

1. As to the General or Literary Education.

I think the age of sixteen somewhat young for entering on the Scientific Course if the Literary Education is then closed; not too young for some minds—nor too young for the exceptionally strong. But few boys have learned to think at this early age. I observe you put logic and psychology in the advanced course. This perhaps meets the objection as to age; for it implies the carrying on in earnest of higher literary pursuits. I should not insist on the study of Greek. It is better if it be taken up. A good man is worse with-

out it than he would have been with it. But accurate study of precise grammatical language must be in some way secured.

I venture to observe that in the study of History, large-minded Biographies should be used, or Biographical rather than military History. Adequate and noble views of Man are needed by a Physician as against mean and selfish and low notions of life. Some religious discipline—that is, some aspiration for a religious life—appears to me as important at least as the possession of any other gift of the mind. Manly recreations, subordinated to the life of work, are needed to call out the manly qualities of energy, resource, and good humor so essential for physician or surgeon. I should encourage rowing or sailing which your youths can have, rather than field sports. There is as much skill in the former, as much danger, and more room for the application of science. The companionship of hardy seamen is good for all men. So is that of the best and manliest sportsmen. At any rate I would urge attention to the manly life—as distinguished from that of book work—but let it be kept in check by the public opinion of the University. I know you to be so keenly alive to the supreme importance of Character for the well doing and happiness of Medical men and for the sake of the Public, through their influence, that I need not dwell on that. I have only to add as the sum of the whole, that it should be clearly understood by the public that no man has become a Doctor of Medicine of Johns Hopkins University who has not passed through that training which you require of a Bachelor of Arts or of Science, or the equivalent thereto, prior to his Professional Studies. And this I gather to be the principle which you desire to carry out by such means as you are able to employ.

II. As to the Preliminary Scientific training.

11th. The time of three years which has been allotted by you to the period of entirely scientific study in the University should be amply sufficient for the Student of Medicine—but is by no means too long. In the present day, the subjects of Physics, Chemistry and Biology have become so extensive that each demands entire devotion for high excellence therein. As regards Biology, in the full sense of the word, it may be certainly said that its essence cannot now be thoroughly understood, or its details mastered, except by

Anatomists and Pathologists who are also Physicists and Chemists. It is impossible for any, therefore, but men of great vigor of mind and robust power to become, in any accurate sense, complete Biologists. Nor indeed is there any one living who would pretend to know a tithe of what is known of the Fauna and Flora of our planet, in all their relations. Nevertheless, the attempt is by no means undesirable. A medical student, well taught by serious and capable teachers, who will take pains to work him in the direction most profitable for the Pathologist, can now be trained in the essentials of Physics, Chemistry and Biology in three years. But the Teachers in each department require three things—Apparatus, Money, and Self-restraint.

You have provided your Professors with the two first—and I have reason to believe they truly and wisely have the third. To illustrate my meaning as to this third, I would say, that if the Physicist will treat his subjects of Mechanics, Heat, Light Electricity, including Acoustics and Optics, only in a sense which he considers perfect, no Medical Students can attend his complete courses except those who mean to become Physicists rather than Physicians or Surgeons.

12th. The Biologist needs opportunity in addition. By opportunity I mean the power of obtaining types of invertebrate and vertebrate Zoology, in abundance and readily. This opportunity by your maritime position you can give—and by the zeal, large-mindedness and general grasp of the whole range of this subject possessed by the Biological Staff, this opportunity has been already used with great effect. None but those who have worked freely in the world of Marine Zoology and Anatomy have any idea of the difference between a superior fresh supply of Marine Animals and mere Museum work for Students. I need not dilate on the healthiness and delight, intellectual and physical, of summer sea-side natural history studies, nor on the magnificent territorial range of your coasts, easily visited. But I may quote a remark I made to Agassiz twenty years ago at Boston, that the results to be obtained in your seas, which extend over so many degrees of latitude, will of necessity be greater than any before known, whenever the number of capable and trained Students has become equal to the task before

them. The day has dawned. As to the extent of Physiological, as distinguished from Morphological studies, I make but one remark that living Pathology is an integral element therein.

13th. It may seem to some that I forget that these scientific studies are a preparation for Medicine. This is not the case. The Anatomy of Man comes within the range of the science studies which you direct, so far as is required for comparison with the lower animals, for the intelligent understanding of Man's place in the Creation, and for the ground-work of Hygiene and Medical Anatomy properly so called. These last are properly to be studied after the three years of the scientific course, in which, however, I observe that general Histology is included.

14th. There are only two other points which it seems right to notice. As the students increase in number, and the Professors are for this reason distracted from original work for themselves, the subjects of the Chairs will have to be subdivided. Physics, Chemistry and Physiology are each too large for one Professor, in so advanced a School as yours, unless as is already the case in the Johns Hopkins University, several assistants for sub-departments are placed under one head. This is a question of administrative organization and beyond my province.

III. As to the purely Professional Studies.

15th. Now as regards the proper studies of the last period, it is not well to say much in the present state of your arrangements.

The provisions of the Medical Bequest require a large Hospital to be made the foundation of the Medical Department, under Trustees quite distinct from the University. The time is not yet come for deciding on the detailed administration of this Hospital. As a special "Medical School" is to be built in the neighborhood of the Hospital, we may assume that the Lecture Rooms, Laboratories, Museum and Library, required for Materia Medica, Toxicology, Surgery, Medicine, experimental Therapeutics and Comparative Pathology, will be in this Institution.

The Clinical instruction will, I conclude, be in the Hospital, under definite regulations. The regulations will have for their central aim the progress of the endowed scholars who reside in the Hospital,

and who are all trained and picked scientific observers, each with his special tastes and aptitudes as Physicist, or Chemist, or Physiologist.

16th. Any remarks on the Hospital itself in its relation to your intentions and to those of your Founder would be an impertinence, had you not desired that I should make some observations thereon. They may be brief. Considering the labor that you have bestowed on inquiry, and the care you have taken in preparing the plans, there could be but one result. Dr. Billings fulfilled your instructions with all the knowledge, industry, and ability which those who know him would have expected of him. The product is a building on the details of which neither thought nor expense have been spared, and of the special fitness of which for its purpose there can be no doubt. A critical examination of it would be out of place here.

Suffice it to say broadly that being of one story with a spacious and lofty basement, and being built on the Pavilion principle, it fulfils the acknowledged conditions of permanent Hospital arrangement. Its general design, aspect, and site are, moreover, unexceptionable. In completeness also of conception it seems to leave nothing to be desired, there being also space for extension.

Those conversant with the literature of Hospital construction, and with the actual modifications of which good Hospitals are capable, will understand how useless would be any discussion of the details without writing a volume. So I will confine myself to very general statements.

You have, by appropriating thirteen acres to the edifice exclusive of the medical school, secured all that can be desired as to space—while on this large area, the several required institutions appear to me to be combined with skill and judgment, as regards relative position, contiguity, and separation. The connection of the scholars' residence with the chief administration block ensures their occupying a social position becoming their claims on your care. Your buildings for the patients who are able to pay for their treatment offer adequate variety of comfort and even of luxury in their design, while your intention to decorate some of the wards of the poorer patients with frescoes, and with flowers architecturally disposed and in abundance, are manifestations as well of your aesthetic care for the sufferers, as for their merely medicinal treatment and

of your recollection of Mr. Hopkins' benevolent ideas in these respects. Your kitchen department is not advanced towards completion far enough for me to speak of it fully; but I am satisfied that it will be a model of that part of domestic Economy which is so well understood, and so admirably carried out, in the United States.

I will not write of minor arrangements,—minor only relatively to the magnitude of the rest,—viz: the buildings for contagious diseases,—the separation rooms from each ward,—the laundries,—the rooms for Autopsies,—the Conservatory,—and the Gardens. I add but a remark as to the Nurses' arrangements. The edifice which you have adopted for the Home of the Nurses will, it is to be hoped, make it possible to carry out your design of inducing women of high education and character to devote themselves wholly to your undertaking. You will thereby train a body of skilled tenders of the sick with an esprit de corps such as Miss Nightingale's Nurses have in England, or such as the best of the Sisters of Charity have in Great Britain, and the Continent of Europe. The principle which you lay down that they shall, when in the wards, be wholly on duty, and when not on duty, be in a united and attractive Home, may be expected to be fruitful of admirable results to themselves in health and cheerfulness. They will also, I trust, help to show to their sisters, elsewhere, the happiness of skilled nursing as a natural profession and career in medicine for their sex. But here I pause—to go further would be to elaborate panegyric or to discuss details—and neither are now to be desired.

17th. It is to be observed, in connection with the last remark, that such a Hospital as yours, and indeed Hospitals of far inferior merit, serve a special purpose as showing the conditions which are deemed desirable for the Hygienic care of the sick. Opinions differ as to what are abstractly the best conditions. Critics can always find objects for the exercise of their skill. You can only adopt one plan—you do not say that no other details but yours are good. It is yours only to do that which certainly is good and in a seemly way. I mentioned this because you may be told hereafter, for instance, that the Building is too widely spread, and that distances are too great; or that there are no radical objections to two stories; or that ventilation can be by open windows. Suffice it, that, taking all

things into consideration, your plans are made so that you believe they cannot be made better, and that, as you execute them, you carefully scan every suggestion that is presented to you, if worthy of notice.

For the purpose of instruction as well as utility, you have adopted a plan of a very comprehensive character, and are executing it in a solid manner, and with a simplicity of aesthetic taste, such as entitles you in these days of labored ornamentation to public gratitude.

18th. There is another subject on which you invited observation, namely, the relation of the medical school and of the medical Teaching to the University and to the Hospital respectively.

Till the Hospital approaches completion it would be wholly premature to discuss this subject except in the most general manner.

(a) The Hospital is destined to fulfil two great objects. One is the treatment of the sick of Baltimore, which numbers 350,000 inhabitants, though not to the exclusion of other applicants. These will enter in conformity with the conditions of admission which you devise for the common good. With this primary object you allow nothing to interfere. The best accommodation,—the best nursing—the best diet—the best medicine and surgical treatment—the means for securing the fittest staff, whencesoever obtained, are, I understand, your role in this matter.

(b) The Hospital being primarily for the sick, there is the second great object, viz., that of imparting to others the medical knowledge of your staff, and of giving means of individual observation and study to students. Now these students are primarily a number of youths selected on these grounds: 1st, of having had good general Education; 2nd, of having subsequently followed a defined course of Bological study; 3rd, of having good character, and of showing aptitude for medical research in some direction. They will form the nucleus of your students—and reside on the spot as holding "Hopkins Scholarships." These men will require instruction in all Professional subjects, Surgical and Medical, in Anatomy, in Medical and Pathological Chemistry, and in all branches of practice in Medicine and Surgery. The Staff, and others if requisite, will be their teachers. They will require Laboratories, work-rooms of various kinds, and Lecture Theatres, besides the Clinical Lecture Rooms,

within the Hospital. All these appliances you propose to build on the Estate adjoining the Hospital and to call the Building, " The Medical School."

Now it would be greatly to be regretted if some of the advantages of your School, Hospital and Staff, could not be made available (under conditions), to many Students besides the " Scholars." Might there not therefore be a large Lecture Room, (say for 500), in a building so placed on the ground that other structures could be added?—and might there not be Laboratories with Anatomical and Pathological Rooms adequate for the Scholars and a few more, but also capable of extension, if required and at any time?

It would seem very desirable not to expend more funds than are really necessary for starting the School, for the Scholars,—so as without delay to establish them—the very nucleus and heart of the scheme. It will be easy to add numbers when the working of the " Honors " department has shown the principle of your institution in operation. Above all, no thought of mere numbers of students should at first influence the arrangements for the Scholars. You want apparatus in kind as complete for twenty-five advanced men, as for five hundred,—indeed more complete. More space only and assistant teachers are needed for the larger number.

19th. This appears to be the place for making a single observation concerning the relation of this Hospital to the teaching of what is called, for want of a better term, " Hygiene." It is not desirable that every Student who intends to practice his Profession should be required to go through a course of study which would qualify him to be an expert in questions affecting the Public Health. But it is desirable that an Institution such as is now being provided by you should, if possible, give its Scholars the opportunity (should they desire it), of acquiring good knowledge of the Departments of Preventive and of Legal Medicine. They might use this opportunity either before they graduated as Physicians, or, as I would suggest, after that period. In the latter case they should have a distinctive additional title to show that they have also devoted themselves to that department. The details may be considered at another time. Baltimore would offer an excellent field for observation. The drainage arrangements of the city which are not good,—the new

works constructed on modern principles,—the details of construction in your Hospital,—and especially those concerned with Ventilation and Heating,—the manufactories and your Laboratories,—all would furnish excellent data in the hands of a Professor.

I venture indeed to add that your school would be an excellent place for the establishment of such a Professor, to be entitled Professor of Comparative National Health,—that is of the general laws which regulate the Health condition of man as man, under his several circumstances of Climate, Locality, Occupation, Government and Race. The neighborhood of Washington, where the National Statistics are collected and stored,—the great Medical Library there,—and the truly National Character of such a Chair,—seem to point to a considerable advantage in founding it in connection with your School and your Laboratories, which may in time be resorted to (as your whole plan implies), by advanced students who desire special and prolonged scientific training in subjects allied to Practical Medicine, but not well suited to ordinary Medical Schools. There are men in the States capable of filling this high post, if an adequate endowment can be provided. In a foundation requiring a rare combination of talents, it would be a really National office, for which the vital statistics of the world are now ripe.

In conclusion, I venture to sum up what I have said:

1st, That your scheme for founding a school of highly educated scientific students, to be devoted to the Medical Profession, is a real addition to the resources of Medical Education in the States.

2nd, That such scientific students need also a previous good liberal Literary Education.

3rd, That such a scheme requires longer time than should, or can, be given by ordinary students.

4th, That the existence of a Nucleus of select "Johns Hopkins Scholars" does not preclude the extension of some of the advantage of the Hospital and School to larger numbers of ordinary students, and

5th, That the building of the "Medical School" attached to the Hospital though primarily constructed for the "Johns Hopkins Scholars" may be made available, under conditions, for a much

larger school, and even for ordinary students from other schools, who may desire to be for some purposes, for a limited time, connected with your foundation.

6th, That your Hospital can be not only a first-class Institution for the care of the sick, but may be used for a model for training nurses; for Lectures on Hospital Construction, and sanitary details; and as a school for teaching the higher principles and facts of "Comparative National Health."

All these considerations are materially strengthened by the fact that you are about to devise in friendly connection with your trust, a great scheme for promoting the health of the children of your district, by Creches, by Hospitals, and by Convalescent Homes, or otherwise, at a cost, as I understand, of $500,000—and that your relations with the Hospital for the treatment of Mental diseases will enable you to utilize for scientific purposes great opportunities for Psychological study under suitable arrangements.

Gentlemen:

I regret that my remarks have extended to so great length, but I beg you to attribute this to my sense of obligation created by the confidence which you have reposed in me, together with the deep respect I entertain for your endeavours and those of your colleagues and coadjutors in the University and Hospital—trusts of Mr. Johns Hopkins.

I have the honor to be Gentlemen,

most faithfully yours,

(Signed), HENRY W. ACLAND,
Regius Professor of Medicine
in the University of Oxford, F. R. S.

UNPUBLISHED AUTOGRAPHS IN THE WELCH MEDICAL LIBRARY

2. An Autograph of Ramond de Carbonnières

GENEVIEVE MILLER

Many men have lived who were very intelligent and clever, who contained a spark of genius perhaps, and were endowed with a personality which made them attractive to other people. But time has engulfed most of these, and we find mention of them only very impersonally in general biographies. Consequently, the true flavor of the individual is lost. Only the very greatest have survived this fate. However, many of the less great are outstanding enough to deserve to be recalled. They are like those living today whom we know and by whom we are influenced, but no one knows how long they will be remembered.

Such a man is Ramond de Carbonnières, who wrote a letter preserved in the Schüz collection of our Institute. He was a Romanticist and a scientist combined, but one phase of his character never conflicted with the other. As a scientist, he was absorbed in natural history, particularly that part which treats of mountain ranges, their structure, formation, and the fossils found on their sides. All his scientific works were carried out with the utmost care and precision. But as a Romanticist and a poet, he saw the beauty and grandeur of the mountains and all nature. Sainte-Beuve discussed Ramond at length in his famous *Causeries du Lundi*. He described him very ably as " ayant heureusement marié les couleurs de Buffon et de Rousseau aux descriptions précises des De Luc et des Saussure.[1] Ramond, c'est le Saussure des Pyrénées, aussi fidèle observateur, aussi rigoureux que l'illustre Genevois, moins simple dans l'exposé des grands spectacles, mais plus ému, plus coloré animé d'une sensibilité plus poètique et doué d'une imagination qui, loin de l'égarer comme tout d'autres, ne fait que rendre le vrai avec plus de vie." [2]

[1] Horace Bénédict de Saussure (1740-1799), Swiss geologist and naturalist.

[2] Charles Augustin Sainte-Beuve, *Causeries du Lundi* (Paris, 1855), Vol. 10, p. 362.

Ramond was born at Strasbourg on January 4, 1755.[3] His mother was German, and his father came from an old family of the French nobility living in Midi. He inherited the quick perception characteristic of the races of Midi and the sensibility and enthusiasm of the north. He was an excellent student and secured his doctor's degree at Strasbourg in both law and medicine. His love for mountains began when, as a student, he crossed Alsace and the Vosges. In his travels he always associated the memories of history with his impressions of nature. As he viewed old ruins, the past came to his mind with the scenes that were enacted there of warring counts and prelates.

Ramond began his literary career by writing poetry.[4] It showed inexperience in style and harmony but touched a note which Lamartine sounded clearly twenty years later. As Sainte-Beuve said, " Les Elégies de Ramond à leur date étaient une plante exotique née sur la frontière, et en portant la marque un peu sauvage." [5] The style and content of his *Elegies* may be seen in the following one:

> Je suis seul, mécontent, au sein de la nature;
> Quand tout chante d'amour, à mes sens moins émus
> Tout est muet, et l'onde, et l'ombre, et la verdure;
> Avec le monde, hélas! mon coeur ne s'entend plus.

In 1777 he visited Switzerland, Germany, Belgium, and England. While he was in Switzerland, he met the most distinguished scientific men. He discussed the mountains with Haller at Berne. At Zurich he saw Gessner, but his special idol was Lavater. He said of him, " l'on ne peut être son ami sans devenir son disciple." [6]

In France, he was liked everywhere and moved in the best circles. As secretary and counselor, he came under the patronage of the cardinal prince of Rohan, the bishop of Strasbourg. In September 1780 the famous charlatan, Cagliostro, came to the bishop's court. He had an extraordinary reputation for practicing the occult sciences and performing miraculous cures. Ramond was fascinated by the clever charlatan, and for some reason unknown to us, followed him and even became his assistant for a while. He was also

[3] *Nouvelle Biographie Générale* (Paris, 1862), Vol. 41, p. 555.
[4] In 1778 some of his *Elégies* were published in Dorat's *Journal des Dames.*
[5] Sainte-Beuve, *op. cit.*, p. 367. [6] *Ibid.*, p. 374.

involved in the famous affair of the necklace (1785) which brought about the exile of his patron.

One may see that Ramond was a young man of high esteem for he was chosen by Thomas Jefferson, the American minister in France, to follow the affairs of the French government in his temporary absence. Jefferson also offered him a position under Washington in America.[7]

In 1787 Ramond first went to the Pyrenees which later became so dear to him. Two years afterwards, he published his charming book *Observations faites dans les Pyrénées*. This was an informal description of the journey he made in these mountains, filled with his own observations and the delightful anecdotes he heard on the way. The book never became popular because it appeared almost at the instant the revolution broke out, and the minds of the people were turned away from literary matters.

Ramond was very enthusiastic when the first revolutionary movements began, and he was an active member of the Society of 1789. After a while he lost confidence. He did not take part in the constitutional assembly, and when he was elected to the legislative assembly in 1791, he was in the resistence. He stood for a monarchial constitutional government along with Lebrun, Jaucourt, Girardin, and Mathieu Dumas.[8] After the throne fell on August 10, 1792, he returned to the Pyrenees. In 1793 he was arrested three times but he refused to leave the country. He was one of those who " respectaient jusque dans son délire la mère qui les frappait." [9] Finally from January 15, 1794 to November 8, of the same year, he was imprisoned at Tarbes.

The scientific movement in France in 1796 resulted in good fortune for Ramond for he was named Professor of Natural History of the department of the Hautes Pyrénées.[10] This gave him an opportunity to begin scientific study in earnest. From now on he spent many happy years in his beloved Pyrenees and during the course of fifteen years, is said to have climbed Pic du Midi, one of the highest peaks, thirty-five times.[11]

[7] *Ibid.*, p. 381.
[8] *Nouv. Biog. Gén.*, Vol. 41, p. 555.
[9] Sainte-Beuve, *op. cit.*, p. 398.
[10] *Nouv. Biog. Gén.*, Vol. 41, p. 555.
[11] Sainte-Beuve, *op. cit.*, p. 399.

Ramond enjoyed many honors in his later years. He was made a resident member of the Institut and commandant of the Legion of Honor. The Emperor, in 1806, made him the prefect of Puy-de-Dôme. This country of Auvergne, situated at the foot of a mountain made famous by Pascal, was well suited to a scientist, and it was here that Ramond performed his barometric experiments which show brilliant and exact work.[12] After the downfall of Napoleon, he held several responsible public offices under the Bourbons, and he was an honorary counselor of state at the time of his death in Paris on May 14, 1827.

Ramond had been Professor of Natural History at Tarbes for two years when he wrote the following letter to Helen Maria Williams. Miss Williams was an English authoress who had moved to France after having become tremendously inspired by the French Revolution.[13] She was quite well known in her day in literary circles. In France she knew many of the leading Girondists and was on intimate terms with Madame Roland. After narrowly escaping the fate of many of her friends at the guillotine, she was imprisoned by Robespierre in the Luxembourg in 1793. Upon her release she went to Switzerland where she collected material for a book about that country which was published in 1789.[14] Ramond's letter is a reply to Miss Williams who, before publishing her book, wrote and asked him for information concerning the difference between Alpine glaciers and those of the Pyrenees.

Tarbes, Départment des Hautes Pyrénées. 19. Nivose, An 6.[15]

Citoyenne

Quelque nombreuses que soyent les déscriptions de la Suisse publiées tour à tour par les nationaux et les étrangers, il n'est aucun de ceux qui ont parcourû cet intéréssant païs qui ne sache que ce qu'on en a dit est encore bien audessous de ce qu'on en peut dire. Je ne parle point de ses richesses

[12] Ramond, *Mémoires sur la Formule Barométrique de la Mécanique Céleste* (Clermont-Ferrand, 1811).

[13] *Dictionary of National Biography* (New York, 1900), Vol. 61, p. 404.

[14] Helen Maria Williams, *A Tour in Switzerland, or a View of the present State of the Governments and Manners of these Cantons, with comparative Sketches of the present State of Paris.* 1798.

[15] January 8, 1798.

naturelles dont le fonds est inépuisable, et où il reste d'amples récoltes à faire sur les pas de nos maitres Haller, Duluc, Saussure; mais que d'observations neuves nous présentent encore les moeurs d'un peuple dont chaque section en a de particulieres et d'originales? que d'instruction à puiser dans la pratique de ses gouvernemens si diférente de leur théorie? que de développemens à donner à une histoire à laquelle il ne manque qu'un Salluste ou un Tacite pour devenir classique! et surtout que de modèles pour le génie de la peinture et le talent des descriptions dans cette nature indéfinîment variée et toujours sublime qui ne peut être contemplée par l'homme capable de voir sans communiquer à ses pensées quelque chose de sa grandeur! S'il est vrai qu'un objet tel qu'il soit n'est connû que lorsqu'il a été considéré sous tous les points de vuë, qui pourra croire que la Suisse était connuë avant d'avoir été observée par une personne de votre sêxe; et combien n'aurons nous pas à apprendre lorsque vous porteréz dans la description de cette contrée le gout, la sensibilité, la finesse de tact qui sont votre appanage? Je félicite surtout vos compatriotes d'avoir enfin un autre guide que M. Coxe; car sans lui contester le mérite de l'éxactitude matérielle à laquelle je crois avoir sufisamment rendû hommage en prenant la peine de le traduire,[16] il est permis de desirer que les personnes qui ne peuvent aller chercher elles mêmes en Suisse les délicieuses émotions que son livre n'a garde de transmettre, puissent juger de cette ravissante contrée par d'autres rapports que ceux d'un auteur qui travaillant prêsque uniquement sur des documens fournis par autruy semble n'employer ses yeux qu' à lire et borner l'emploi de ses facultés intellectuëlles à l'usage de sa mémoire.

Mais c'est moi particulierement que je dois féliciter du jugement que vous portéz sur des ésquisses que j'ai tracées à un age où je n'aurais pû compter sans présomption sur la durée de mon ouvrage. Alors je savais sentir

[16] Ramond, *Lettres de M. William Cox à M. William Melmoth sur l'état politique, civil et naturel de la Suisse,* translated from English with *Observations* (Paris, 1781-1782).

bien plus que je ne savais voir, et vous avéz raison de penser que quinze ans de voyages, d'études et de réfléxions ont dû beaucoup étendre les premieres idées que l'aspect des glaciers m'avaient fait concevoîr. Vous en auréz la preuve dans un ouvrage sur les Pyrénées que j'ai publié il y a quelques années, et qui vous sera remis probablement au moment où vous recevréz cette lettre. Vous y trouveréz la déscription de la partie la plus élevée de cette chaine et des nombreux glaciers que j'y ai découverts. Mais ce qui répondra directement à la demande que vous vouléz bien me faire, c'est le 14.e chapitre qui est entierement employé à comparer les glaces des Pyrénées à celles des Alpes, et à tirer des inductions générales de cette comparaison. Je poursuis maintenant ces observations, et si la lecture de celles que j'ai publiées vous inspire de l'interêt pour les montagnes que j'habite aujourd'huy, vous ne seréz pas fachée d'apprendre que cette année je suis parvenû à la partie moyenne du Mont Perdu que l'on peut regarder comme le Mont Blanc des Pyrénées et que personne encore n'avait tenté d'approcher. Là j'ai trouvé des glaciers qui ne le cedent guère à ce que les Alpes ont de plus magnifique en ce genre. Mais ce que les Alpes ne vous ont point montré; ce qu'elles ne montreront probablement à aucun observateur, ce sont les formes étranges, l'aspect épouvantable des montagnes calcaires secondaires portées à une telle hauteur; ce sont les débris du règne organique gisant sur leurs cimes; ce sont les ossemens des quadrupedes terrestres mêlés aux coquilles des testacés et aux loges des Zoophytes; c'est le cimetiere des Antédiluviens à quinze ou dixhuitcens toises audessus du niveau actuël de la mer.

Recevéz, Citoyenne, l'hommage de mon respect

RAMOND Associé de l'institut National de France, Professeur d'Histoire naturelle à l'Ecole Centrale des Hautes Pyrénées.

Permettéz que le Cit: Lasteyrie trouve icy mes Saluts. Je ne lui ai point écrit parcequ'il ne me donne pas son adresse.

NOTES AND COMMENTS

HERBA MOMORDICA

HENRY E. SIGERIST

In one of the previous numbers of the Bulletin I published a short medical treatise from the 15th century manuscript 277 of the University Library in Montpellier.[1]

This treatise dealt with the medicinal virtues of a plant called *herba momordica id est caranza.* Caranza being the name commonly used, since the early middle ages, for madder and madder having been used since antiquity not only as a dye but as a medicinal plant, I assumed that the plant described in the Montpellier manuscript was madder.

I was wrong. My friend and colleague, Professor Pietro Capparoni, of the University of Bologna, drew my attention to a significant passage in Mattioli's commentaries to Dioscorides. Discussing Dioscorides' Ἄμπελος μέλαινα Mattioli proceeds:[2]

> Sed quoniam Vites tam alba, quam nigra, de quibus hactenus dictum est, mihi in mentem eam herbam redegerunt, quae aliquibus vulgo vocatur BALSAMINA, aliis Viticella, aliis Momordica, aliis Caranza, cum veteribus nihil de ea posteritatis memoriae proditum sit, sitque dotibus quam plurimis non obscuris praedita, hunc locum opportunum duximus, in quo huius herbae historia pertractetur. Est itaque VITICELLA, sive Balsamina, planta, quae praelongis, tenuibusque viticulis, ultro citroque reptantibus, proximas tum herbas, tum arbusculas comprehendit: foliis vitis albae, aut viniferae similibus, sed longe minoribus, magisque per ambitum laciniatis: capreolis tenuibus ex alarum sinu prodeuntibus, quibus sese im-

[1] A fifteenth century text on the medicinal virtues of madder (rubia tinctorum). *Bulletin of the Institute of the History of Medicine,* The Johns Hopkins University, 1936, vol. IV, pp. 57-60.

[2] Petri Andreæ Matthioli Commentarii in sex libros Pedacii Dioscoridis, Venetiis, 1570, pp. 792-793.

plicat appositis adminiculis. Florem promit cucumeri similem, colore subluteum: fructum utrinque turbinatum, qui ovi fere faciem repraesentat, cute carnosa, quibusdam acutis bullis rigente, dipsaci modo. Huic maturo puniceus color, qui praeterea facile dissilit ultimam maturitatem adeptus. Semen includit anguriae vocatae simile, minus tamen, contectum cute crassa, pingui, lubrica, et perquam rubente. Planta haec gracili nititur radice, nec citius fructum perficit, ac maturat, quam adventante autumno, Augusto, et Septembri mensibus. Nusquam nisi sata, quod sciam, in Italia provenit: pluribus autem in locis inibi plantatur, et nascitur. Folia vulnera recentia glutinant. Fructus exempto semine insolantur diu in oleo omphacino, aut macerantur eodem oleo in balneo calentis aquae, aut equino calente fimo, sitque inde oleum praestantissimum ad arcendas vulnerum, mamillarumque inflammationes, doloresque mulcendos. Valet idem ad exulceratos, inflammatosque uteros siphone iniectum. Doloribus haemorrhoidum mire auxiliatur: in quem usum macerantur fructus (ut diximus) oleo amygdalino dulci, aut e semine lini expresso, addita ad unamquanque olei libram, liquidae vernicis uncia. Medetur hoc ambustis tam igne, quam aqua. Punctis, sauciatisque nervis utiliter illinitur: quin et vulnerum cicatrices tum attenuat, tum etiam prorsus delet. Scribunt recentiorum quidam, steriles mulieres faecundas fieri, si a balneo medicamentis utero conferentibus parato, hoc oleo uteri osculum sibi perunxerint, ac demum suis se iunxerint viris. Ramicosis pueris efficax remedium est, si eo locus saepius perungatur. Foliorum pulvis (ut ii affirmant, qui periculum fecerunt) cochlearis mensura ex plantaginis, sive equiseti decocto intestinorum vulnera sanat. Nec desunt qui eundem pulverem laudibus efferant, ad coli dolores, et intestinorum tormina. Porro illud hic praetereundum non est, ne forte huiusce plantae nomina alicui imponant, quod sunt qui Momordicam etiam appellent geranii genus quoddam, illud scilicet, quod maiora inter caetera folia profert, malvae amplitudine, de quo libro tertio in Geraniis abunde disseruimus.

There can be no doubt that the herba momordica sive caranza of the Montpellier manuscript is not madder but the viticella or balsamina of Mattioli, which in modern nomenclature is Momordica Balsamina (Linné). The description and indications are in both texts very similar. The interest of the Montpellier manuscript lies in the fact that it gives the magical indications not to be found in Mattioli.

There is no doubt that Balsamina was a popular remedy. Professor Capparoni wrote me that in his youth Balsamina oil was kept, in Italy, in every household as a universal remedy against all kinds of ailments.

MEDICO-HISTORICAL ACTIVITIES IN THE UNITED STATES

NATIONAL

American Association of the History of Medicine.

The American Association of the History of Medicine held its 12th annual meeting at the Hotel Haddon Hall in Atlantic City, New Jersey, on May 4th, 1936. The afternoon session was held at 2 p. m. with Dr. William S. Middleton presiding. The following papers were read:

"John Warren, The Father of the Harvard Medical School." Dr. Joseph H. Pratt.

"Concepts of Cardiac Pathology before Morgagni." Dr. Esmond R. Long.

"Children and Witches." Dr. Sanford V. Larkey.

"Dr. Pirogoff, the Russian John Hunter." Dr. M. L. Ravitch.

"Spontaneous Combustion, a Literary Curiosity." Dr. John R. Oliver.

"Historical Notes on Foreign Bodies in the Food and Air Passages." Dr. Louis H. Clerf.

"Greek Medicine in its Relation to Religion." Dr. Ludwig Edelstein.

"The Correspondence between President Jefferson and Dr. Waterhouse and its Bearing on the Introduction of Smallpox Vaccination." Dr. Robert H. Halsey.

"Haller's Scientific Controversies." Dr. Owsei Temkin.

The dinner session was held at 7 p. m. at which time three papers were presented:

"Notes and Impressions on the Tenth International Congress held in Madrid in September, 1935." Dr. Edward B. Krumbhaar.

"The Social History of Medicine." Dr. Henry E. Sigerist.

"Some Old Hospitals in Spain." (Lantern Slides.) Dr. Howard Dittrick.

Dr. Henry E. Sigerist was elected President of the Association for the next year.

IOWA

The State University of Iowa, Iowa City

A medical history club has been organized at the Medical School. At the present time it consists entirely of faculty members. The club meets once a month at which time original papers are presented.

MISSOURI

A pilgrimage to the grave of Dr. William Beaumont in St. Louis was made on November 21, 1935 in commemoration of his one hundred and fiftieth birthday. Tribute was paid to Dr. Beaumont's contributions to medical science and floral wreaths were placed on his grave by doctors representing the St. Louis Medical Society, the Southern Medical Association, the American Medical Association, the Missouri State Medical Association, the International Anesthesia Research Society, the Mid-Western Association of Anesthetists and the Southern Association of Anesthetists. After the services at Bellefontaine Cemetery the group returned to the city to attend the scientific sessions of the Southern Medical Association.

NEW YORK

Cornell University College of Medicine, NEW YORK

A medical historical society has been organized consisting, at the present time, of a group of about twenty students. Meetings are held once a month. Papers have been presented on the following subjects:

"The Definition of Fevers in America."

"Benjamin Rush and the Early History of Yellow Fever."

"Walter Reed and Yellow Fever."

At the end of the academic year there will be a combined meeting with the students of Bellevue and of the College of Physicians and Surgeons.

MARYLAND

University of Maryland, BALTIMORE

At the Medical School of the University of Maryland, Dr. John Rathbone Oliver, the Professor of the History of Medicine at this institution, gave his yearly series of lectures beginning on February the twentieth and ending on April the sixteenth.

The course is planned so that the entire field of medical history may be covered in four years. During the past academic year, the lectures have dealt with the medicine of the 18th and 19th centuries, with especial emphasis on the beginnings of the development of medicine in America.

One lecture was given by Dr. Owsei Temkin of the Institute of the History of Medicine at the Johns Hopkins University, who lectured on the Early History of Clinical Teaching.

In the coming year of 1936-37, the lectures will deal with the beginings of medicine in primitive civilizations, with the medicine of Babylonia, Egypt, India and Greece.

The Head of the Department is always glad to welcome any student who is interested in Medical History and will be glad to advise him as to his reading or to suggest subjects for special study.

THE JOHNS HOPKINS UNIVERSITY, BALTIMORE

Institute of the History of Medicine

The following lectures were delivered by Dr. Sigerist:

April 14th—"The Historical Aspect of Art and Medicine." Goucher College Alumnae Association.

April 21st—"Developments in the Attitude of Society and Medicine towards the Child." Annual meeting of the Child Study Association.

April 29th—"The Protection of Health in the Soviet Union." Medical Society of the District of Columbia, Washington, D. C.

Dr. Temkin delivered an address and demonstrated the Leeuwenhoek film before the Maryland Biology Teachers Convention on April 18th at the University of Maryland, College Park.

The Institute has to acknowledge several valuable gifts. Dr. William B. Johnston presented the Institute with a copy of the following:

Lavater, John Caspar: Essays on Physiognomy, designed to promote the knowledge and the love of mankind. 800 engravings. London, 1789. 3 vols. in 5, royal 4to.

Dr. Hugh A. Baldwin presented the Institute with a pair of Dr. Perkins' Tractors from the estate of his father, Dr. James F. Baldwin.

A number of books have been deposited in the Institute by Dr. Robert T. Miller, Jr. They include the following:

The Workes of the famous Chirurgion Ambrose Parey, translated by Thomas Johnson. London, 1649.

Andreae Vesalii: Opera Omnia Anatomica & Chirurgica, Lugduni Batavorum, 1725. 2 volumes.

The Johns Hopkins Medical History Club

The club held its third meeting of the year on April 20th. Two papers were read:

"On Soranus and Ancient Obstetrics." Dr. Owsei Temkin.

"Ambroise Paré Does a Delivery." Dr. Alan F. Guttmacher.

An exhibit illustrating the history of the obstetrical book was displayed in the Exhibition Hall.

Dr. Sigerist sailed for Europe on May 26th and will be back in the beginning of October. He intends to spend June and July in the Soviet Union and August and September in Switzerland.

H. E. S.